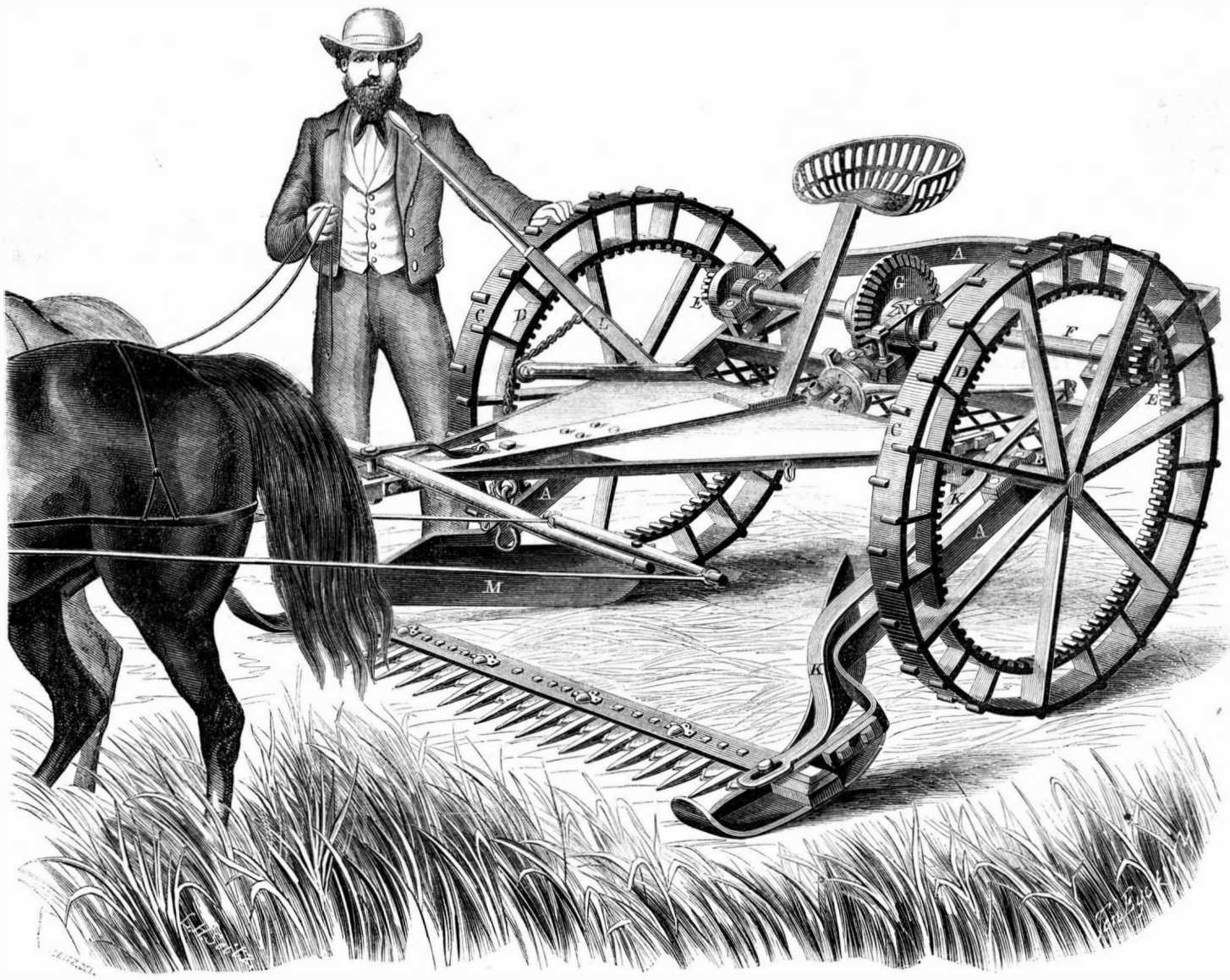
# Scientific American.

A WEEKLY JOURNAL OF PRACTICAL INFORMATION IN ART, SCIENCE, MECHANICS, CHEMISTRY AND MANUFACTURES.

VOL. IX.—NO. 14. (NEW SERIES.) NEW YORK, OCTOBER 3, 1863. SINGLE COPIES SIX CENTS. $3 PER ANNUM—IN ADVANCE.


### Improved Patent Mowing Machine.

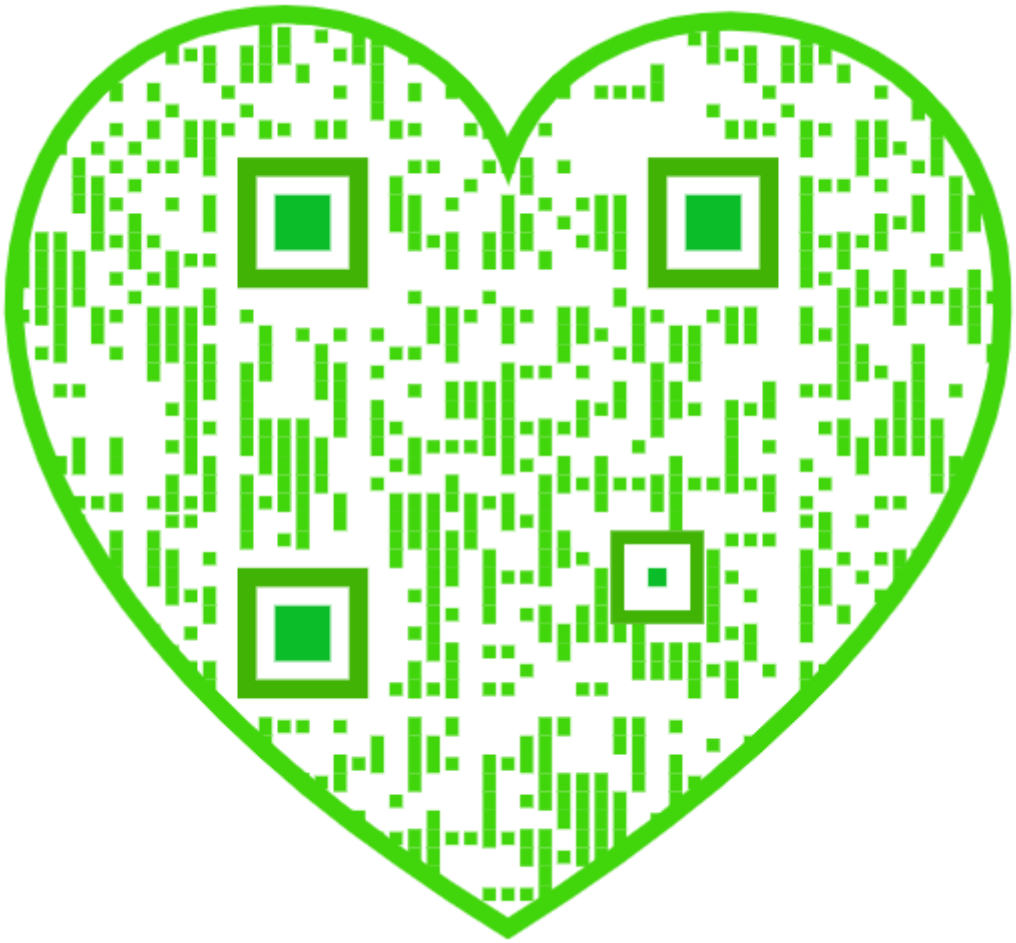
The prosecution of modern farming involves so many new and scientific details, that, in order to keep up with the times, the agriculturist must have a smattering of all trades and not a few sciences. The chemist has come to the farmer's aid and taught him how to regulate his wasted lands; he has placed within his reach fertilizers that quicken the slow soil and make the bosom of the earth throb again with increased vigor: until where the maize stood nodding in the wind and draining the vitality from the soil year after year, another crop alternates with it, and takes up for its sustenance what the corn rejected. Thus the chemist aids the farmer to replenish his exhausted land, and with the recurrence of harvest time to fill the barns that stand waiting for their load. When crops increase in quality, they are also likely to gain in quantity; and as the riches of the farmer increase with his skilful husbandry, his acres extend also, until the whole face of the country blossoms like a garden, and the sullen forests recede, allowing the fields more room. The old-time processes which once answered all purposes are no longer available, and the ingenuity of inventors—many of them farmers—has supplied the means for expediting agricultural labor. In the annexed beautiful engraving the reader will discover a new and most efficient mowing machine, which has been on exhibition at the Fair of the American Institute in this city, and at the State Fair held in Utica, N. Y. It is the invention of an enterprising farmer, Mr. J. D. Wilber, of Dutchess county, and combines many excellent features. Appended is a full description of the machine. It is extremely simple.




WILBER'S PATENT MOWING MACHINE.

The strong iron frame, A, is hung by boxes upon a stout iron axle, B, on which are the geared and ridged wheels, C. These wheels are of extraordinary size for a machine of this class, and afford an easy draft. In the wheels, A, there is a second wheel, D, which is toothed and has small pinions, E, working in it; these pinions are on a transverse shaft, F, which carries the bevel gear, G, in the center. This gear has also a small pinion (not visible) meshing into it, which drives the eccentric, I, on the shaft, running in the boxes, J; the rod of this eccentric is connected by an easy joint to the long lever, K, which works the cutter or finger bar. This latter is similar in nature to all others, and no novelty is claimed for it except in its position. These are the principal parts of this machine. It will be noticed that the essential peculiarity of this mower is that the cutting apparatus is in front of the machine, and it is therefore direct in draft. This feature is one of no small importance, as by it the labor of the team is greatly reduced and the work expedited. The machine is also very nearly balanced on the axle, so that no dead weight is dragged in front or behind, and only sufficient weight is thrown on the forward part of the frame to keep the cutters down to their work. By taking hold of the back end of the frame, a boy of ten years may easily raise the fore part clear of the ground. On the platform where the driver sits, there can be seen a lever, L, which has a chain attached; this lever is to raise the cutters up to clear any obstructions that are observed ahead, and also to fold the machine when brought to the field. The gearing of this machine is all up out of the grass, and the teeth cannot become clogged with grass, seed, or stalks. The track-clearers, M, also throw

© 1863 SCIENTIFIC AMERICAN, INC.



the grass between the wheels, so that the way is at all times clear. When not in use, the cutter bar may be instantly thrown out of gear by unshipping the clutch, N, on the shaft, G ; the pinions then revolve, but the cutters are idle. This mower can work closer to a tree or stone than any other, because it has direct draught, and the great size of the wheels gives an advantage in going over the obstacles that abound more or less in every mowing lot, as also the roads leading thither. The cutters are always in the same relative position with the gearing, and the grass is always left light and loose, the machine not touching it after it is once cut.

These features, it is believed, comprise the all essential ones of such machines, and this one is highly spoken of by the leading farmers in Dutchess county.

The mower was patented through the Scientific American Patent Agency, on Feb. 10, 1863, by J. D. Wilber. Further information can be had by addressing the inventor at Pleasant Plains, Dutchess county, N. Y.

## BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE---ADDRESS.

This Association commenced its annual meeting on the 26th ult., at Newcastle, England, with an opening address by Sir Wm. Armstrong, the President for the year. He said, twenty-five years ago the association had met in the same place, and he was naturally led to a review of the extraordinary progress which had been made within that time. "It was indeed almost within that short period that science had acquired acknowledged practical importance. It is since 1838 that railways have spread over the country, that the Atlantic has been crossed by steamers, that electric telegraphs have been perfected, and that half the marvellous machines which have increased a hundred-fold the natural powers of man have been brought into existence. Nothing perhaps, is so remarkable in this quarter of a century of scientific progress as the way in which one discovery has led to another. The use of heat, for example, as a means of developing motive power, has led on to the discovery that heat is itself a form of motion, so much so that the amount of heat can be exactly measured by a certain amount of motion. One unit of heat represents the raising of 772 pounds weight to the hight of one foot, and heat and motion have been proved to be convertible into each other. This consideration, combined with strange astronomical observations, has led again to the most extraordinary speculations on the character and source of the heat of the sun ; and Sir William considers it a not unreasonable hypothesis that the light and heat of the solar system are due to planets or meteors falling into the sun. The same theory again comes round to more homely uses, by testing the heat which is produced in a cannon-ball in striking a target. It is possible to gage the amount of force which is, as it were, rejected from the side of a ship or fort, and consumed in the engine of offence itself. A given amount of motion in a cannon-ball is equivalent to so much heat, and if we measure the amount of heat produced in the ball after contact with the target, we know that the force represented by that heat has been consumed in the ball itself, and that only the remainder has taken effect on the target."

In this address it is clearly set forth that England's greatness depends upon the patience of her men of science and the ingenuity of her inventors. The natural resources of the country for manufactures are great, but they would be of no avail without the genius and labor of man in their application. All the machinery and all the manufacturing operations of England are dependant upon a sufficient supply of cheap coal and iron. But eighty-six million tuns of coal are consumed annually ; and at this rate Sir William Armstrong considers the supply will be exhausted in 200 years. When this takes place England will sink into a third-rate power, unless a cheap substitute for coal is invented. This may be achieved, for the art of invention grows with invention, power increases with power, and knowledge generates a capacity for more knowledge. For all intents and purposes the mind and will of man are infinite. He cannot, indeed, break away from the laws under which he is laid, but the laws are only intended to guide, and not to restrict him. With patience there is nothing he may not know and nothing he may not do. Sir William advocated the use of stenography. He said, "our words are in a great measure made up of such syllables as com, con, tion, ing, able, ain, ent, ance, est, &c., the labor of writing which is very great ; and they might be dispensed with by using a few simple signs." He also advocated the adoption of the French system of weights and measures for England and all nations. The address contains many useful observations, but not much which we consider original; indeed a great portion of it is taken up with information that has already appeared in our columns, and which it is unnecessary to repeat. We shall endeavor, however, in future numbers to collect and present the new and practical information brought before the association in the papers read by the members in their different departments.

## THE FAIR OF THE AMERICAN INSTITUTE.

We continue in this number the brief notice we have given of the most prominent objects at the Academy of Music—the building in which the Fair is held. The horticultural display was opened on the 16th instant, and is a very great addition and relief to the more material and substantial articles on exhibition. As the visitor enters, a huge orange tree meets his gaze ; the branches are well laden with immense globes, not yet ripened into that golden color which is so pleasing to the eye. Down the lobbies, where the young exquisites are wont to stroll when the opera is held here, are arranged rows of dahlias, of the usual variety and excellence ; but up-stairs, on the second floor, the collection of gladiolus and other plants is very fine indeed. The greatest attraction to us in this line was

### THE POMOLOGICAL DEPARTMENT.

The whole of the underground region of the Academy is devoted to fruits and vegetables, excepting only such apartments as are reserved for other uses. The long tables look extremely enticing, and the fruits thereon are creditable to the skill and experience of the culturists. There were many varieties of pears and apples with which we were unfamiliar, both in name and flavor, though ardently desiring a nearer acquaintance ; we were, however, not unable to appreciate some magnificent Duchesse d'Angouleme pears which must have weighed fully a pound each. This fruit was raised by Professor Mapes. Mammoth vegetables, squashes, beets, potatoes, also abounded ; but as they are not new inventions, and the internal arrangement, details, operation, and use of them are quite familiar to all readers of the SCIENTIFIC AMERICAN, we forbear further allusion to them.

### ELECTROTYPES.

In relation to some superb specimens of this art on exhibition, we must say a passing word. In Europe, from time immemorial, battles, races, the loves of the poets, of the gods, and of humbler mortals ; the escapades of heroes ; famous characters in song or history ; kings, knights, popes, princes, ladies of honor, and those without it ; feudal life, and the glories which are supposed to attach to single combat with serpents, lions, and wild beasts of all kinds —these subjects scenes, individuals, &c., have been fixed by the skilful hands of artists, ancient and modern, in immortal marble, or in medals, coins, and busts of bronze. The possession of such rare works usually falls to the lot of royalty, or those whose income equals that of princes. Indeed, the possession of a rare statue or medal is counted often among the treasures of the State, and no little envy and bickering has ensued between disappointed persons who counted on obtaining some great work but were forestalled.

By the discovery of the art of electrotyping, all the beautiful works alluded to may be copied without losing a line or a touch of their original elegance ; and the homes of most men may be adorned and a pure taste cultivated at a small cost. The display of electrotypes at the Fair is very fine indeed ; and we feasted our eyes on salvers and medals, bas-reliefs and antiques, without end. These were exhibited by A. Haas, and betoken a proficiency and skill in the art which is a decided acquisition to the community. Of

### PHOTOGRAPHS,

The Messrs. Gurney, Fredericks, and the American Photographic Company, had fine specimens on view. The Gurney pictures are peculiarly vivid and lifelike, and leave nothing to be desired in their execution. Our attention was especially called to some portraits of individuals which were intensely natural in their expression and attitude. It was with difficulty that we convinced a relative that they were really photographs. Of the card pictures now so popular, little can be said to enhance their value in public estimation. With almost electric swiftness the introduction of the idea has been followed by the process, in every town from California to Maine ; and the most uncouth backwoodsman has his rough points toned down, and is presented side by side with the city exquisite, through the skill of the photographer.

Outside, in the hall of the same story, the American Photograph Company (a new title to us, by the way,) has also some excellent pictures, two of which particularly claimed our attention by their singular fidelity of detail.

### THE "FINGER-GRAPHIC" ARTIST.

The photo's have a rival in the person of a fine old gentleman, who has been a regular attendant at the Fair for many years, almost as far back as we can remember. This old gentleman cuts likenesses or *silhouettes*, as they are called, out of black paper ; they are finished in profile, of course, and are really good resemblances of the persons from whom they are taken. Young gentlemen and ladies form the principal patrons in this school of art, and they are "cut out" individually in about three minutes.

### SHELL WORK.

It is really surprising to see what delicate and beautiful effects can be produced by judicious combinations of fine sea shells. A great profusion of picture-frames, flowers, and grottoes thus made were on view. We could not obtain the exhibitor's name. We descend the stairs again to the machinery department, and find therein a handsomely finished model of a

### NEW SEED-SOWER AND HARROWER.

This is an extremely ingenious tool, combining the essential features of such a machine with others not usually obtained. The seed is dropped in front of the harrow, which has a weaving motion that covers in the grain as fast as it reaches the earth ; a large roller behind makes the surface smooth and even ; but we have no space to allude to it in detail. It is patented by John T. Foster. Wilber's patent mower, which is illustrated on the first page of the present number, was also at the Fair, where it attracted much attention. We noticed a small model oscillating engine, made by W. Corbett, of the Continental Iron Works, which was very nicely finished, and well proportioned. Demorest's running-stitch machine, also one by Cook, did good work for machines of their class. A new and important addition to the sewing-machine has recently been made in the shape of a "Tucker." We were requested to examine it, and did so. The machine was simple enough, but the utility of it, owing to a want of familiarity with linen garments and the mysteries appertaining thereto, was past our comprehension, until the attendant relieved our embarrassment by stating that the folds, or tucks, of children's dresses, and other things unmentionable, are very troublesome to make ; by the simple addition of this apparatus to any sewing-machine, one fold is creased while the other is being sewed, so that there is no delay, and the work is done much better than it could be without the tucker. It is certainly a valuable addition to a sewing-machine, and can be attached to any style in the market. Exhibited by Madame Demorest.

### SWORDS AND FLAGS.

Tiffany & Co. exhibit a superb assortment of sword and flags. About the swords—few persons would suspect that the white marble building on Broadway, tenanted by this firm, is, in fact, a first-class armory, on a limited scale. It is true that no blunderbusses, arquebusses, matchlocks, or other murderous engines, are fabricated there ; but the springy, elastic, faithful sword is made in large numbers, of unvarying excellence, and superb finish, from scabbard to guard. If any zealot in his mad career should draw the sword and throw away some of the scabbards that we saw at the Fair, we should like to have them cast our direction. Eulogium cannot express the elaborate and exquisite cunning manifest in every line of the delicate tracery that covers the blade, or the

© 1863 SCIENTIFIC AMERICAN, INC.

strength and beauty of the figures which adorn the hilt and guard. Some presentation swords have been made here which cost as high as $2,400. We have seen the process of forging the blades and grinding them, and the excellent temper bestowed upon them imparts a higher character as trusty weapons than mere external gilding—although we may remark that the designs of the ornamentation are chaste and in the best taste. Our space forbids further mention of the novelties—and indeed we shall be compelled to omit much that is noteworthy through lack of room.

A FIRST CLASS IRON FORGING.

Messrs. Lazell & Perkins, of Bridgewater, Mass., proprietors of the immense forge at that place, have a very excellent piece of work at the Fair, in the shape of a stern bearing for the new light-draught monitors. It is not very large, but the nature of the work, and the difficulty of handling it, render the accomplishment of the task in its present shape highly creditable.

### Mechanical and other Items of the War.

HOW SOLDIERS CARRY WATER.—There is a contrivance of the soldiers at Baton Rouge, for carrying water to the camps, that displays considerable ingenuity. An ordinary barrel has a block of wood fitted to the head with a pivot, like the wheel of a wheelbarrow, and a rod of iron like the tongue of a buggy, that forks near the barrel, to draw it like a garden roller, the barrel revolving like a wheel. Two men will draw a barrel up the levee with considerable ease. A negro, looking on at the performance, said, "Well, 'fore God, what won't white men do."

THE "IRONSIDES" AT FORT SUMTER.—The manner in which the armor of the *Ironsides* has thrown off the rebel shot causes general satisfaction, though she has not yet been closer than 1,800 yards to the rebel batteries. Most of the heavy shot have crumbled to pieces on her solid sides, and the rifled shot have only made indentations without doing the slightest damage. She has received two 10-inch shot on her port stoppers, and even there they only made indentations, without doing any harm to her. The steel-pointed shot have made cuts about an inch deep. She will, however, be tested within 800 yards when the great assault is made.

THE *Tecumseh*, iron-clad monitor battery, was launched from Secor's yard, at Jersey City, on the 12th inst. The vessel is of the new lot of monitors ordered, and has an unusually good model; she is 235 feet long, 46 feet beam, 14 feet deep, and draws 14 feet of water in fighting trim. She has one turret, and is in other respects similar to all the other ships of her class. Two more batteries are nearly ready at this yard.

A Morris Island letter says the rebels have recently fired large slabs of iron, two feet in length, and four or five inches wide, bound with strong wire. They are thrown with a view of getting them under the turrets to prevent them revolving.

[As the junction of the turrets with the base on deck is about a line in thickness, it will be seen that the prospect of getting one of the "slabs" under is slightly remote.—EDS.

The number of prize vessels taken into the port of Philadelphia since the beginning of the war is eighty-five. The most valuable, including the cargo, was the steamer *Bermuda*, which realized more than half a million of dollars. Several of the late prizes, which brought heavy cargoes of cotton, realized large sums.

Any drafted man who is an experienced marksman, and can prove upon affidavit that he has made five consecutive shots, not exceeding 25 inches, with a target rifle, distance 200 yards, at least, will be admitted to Berdan's Sharpshooting Regiment. This is according to the regulations of the War Department.

As an illustration of red tape inhumanity, it is told that the steward of one of the hospitals in Washington declined to furnish ice to stop a soldier's hemorrhage, because it was not the appointed time to open the ice chest! The soldier died.

The *Roanoke* iron-clad battery is about to be returned to the defense of this city; the greatest possible dispatch is being used in completing the other iron-clads now building here.

Fabulous weights are attributed to the 15-inch shot and shell; some paragraphs state that they weigh 455, 550, and even 675 pounds. This is nonsense. A 15 inch shot is not solid, but cored out or hollowed in the center, so that the walls are only 4½ inches thick; in other words, there is a hole 6 inches in diameter in the middle of a 15-inch shot In this condition it weighs 400 pounds. Another pattern is made which has walls 3¾ inches thick, and weighs 329 pounds. When filled with powder or sand, their weight is of course increased. These weights are from the actual exhibits of the scales.

An engine is now building in this city for one of the new sloops-of-war. The cylinder is 32 inches, and the piston has 8 feet stroke; it is stated that 100 revolutions per minute are guaranteed; this is equal to a piston speed of 1,600 feet per minute. When it is considered that 600 feet is far better than most engines do, it will be seen that quite a novelty is in store for the engineering community. If the time had been stated in seconds instead of minutes, the velocity of the piston would equal that of a Parrott shot.

Major Henderson, of New Hampshire, was sitting in one of the trenches at Charleston, when an immense projectile from the rebel works struck in the bank directly behind him, tipping over a cart-load of dirt upon and nearly burying him. He found himself firmly fixed in the sand, with the elongated 10-inch missile lying up against his shoulder. He supposed it to be a shell, and his feelings while waiting for it to explode were quite unenviable.

Preparations have been made at the Philadelphia Navy Yard to receive the rebel ram *Atlanta*, which is expected from Port Royal every day. Orders have been sent to have her completely overhauled and put in condition for service. This will take considerable time, and several important changes are to be made in her. It is said that she will be put in the same condition as our one-turreted iron vessels.

Amongst a batch of about fifty guns landed at St. Louis, from those captured at Vicksburg, many bore evidence of severe usage; some were torn by the bursting shell, some had large pieces knocked from the muzzle by the striking of a cannon ball, some were cracked two-thirds of their entire length, whilst others had burst under the heavy duty they were called upon to perform.

It is understood that the prize-money of the navy amounts to $30,000,000. Most of this sum will come directly or indirectly from British pockets. Of this, few will be disposed to complain. There have been numerous heavy failures in England from this cause, and more will inevitably follow.

The *Harriet Lane*, captured by the rebels at Galveston, Texas, still lays off Redfield Bar on that coast. Her shaft was bent by a round shot in the engage, ment, and the engine cannot consequently be made to work.

It is stated by the last advices from Europe that the English authorities have detained the rams now building for the rebels. It is to be hoped that they will not repent of this act of justice, and let them slip through some legal quibble.

## MISCELLANEOUS SUMMARY.

THE Sandwich Islands are decreasing in population and business. The number of foreign vessels which had arrived at Honolulu during the first half of the present year was less by half than during the corresponding period of last year. There is a great scarcity of laborers for the sugar plantations, and parties are earnestly urging the Government authorities to import coolies from Polynesia. The population of the Islands is decreasing more rapidly than at any former period. It is now estimated that they contain only 66,000 inhabitants.

AN express locomotive on the Great Eastern line, England, has 16 inch cylinders, and 24 inch stroke: the steam ports are 12 inches by 1½ inches; exhaust, 12 inches by 3 inches; outside lap at each end, 1½ inch; lead ⅛ inch. The valve opened the ports from ½ inch to ⅝ inch when the lever was in the short notches. At 250 revolutions per minute, the steam port would be open for about one-thirtieth of a second.

THE PACIFIC RAILROAD.—The Chief Engineer of the Pacific Railroad has just issued his first annual report. Contracts for the construction of the first fifty miles from Sacramento, Cal., have been let, and the work is going on bravely. Materials for the great bridge over the American have arrived, the foundation of two piers has been completed, and the coffer dam around the center pier driven. Six miles, comprising the fifth to the tenth sections, are ready for the track. Six thousand tuns of iron have been purchased, and will be delivered at the rate of 500 tuns a month. Much of it is already on the way from the East, as are also the turn-tables for the first fifty miles, six locomotives, six passenger cars, two baggage cars, and twenty-five freight cars. The estimated cost of the first division of fifty miles reaches to within six miles of the summit, and will be put under contract about the 1st of December.

RAW HIDE.—How few persons know the value of raw hides! It seems almost strange to see them sell all their "deacon" skins for the small sum of about thirty or forty cents. Take a strip of well tanned raw hide an inch wide, and a horse can hardly break it by pulling back—two of them he cannot break any way. Cut into narrow strips and shave the hair off with a sharp knife, to use for bag strings, the strings will outlast two sets of bags. Farmers know how perplexing it is to lend bags and have them returned minus strings. It will outlast hoop iron (common) in any shape, and is stronger. It is good to wrap around a broken thill—better than iron. Two sets of raw hide halters will last a man's lifetime—if he don't live too long. In some places the Spaniards use raw hide log chains to work their cattle with, cut into narrow strips and twisted together, hawser fashion. It can be tanned so that it will be soft and pliable like harness leather.

OVERLAND TO CHINA.—The commercial classes of England are taking a very active interest in a project for opening communication, overland, with Western China. A satisfactory treaty has lately been concluded with the King of Burmah, which, among other advantages, grants to British traders the right of transporting merchandise through Burmese territory, free of duty and inspection. The only point that remains to be settled, is the practicability of the proposed route, and the Government is petitioned to instruct the Viceroys of India to have careful surveys made of the country through which the road is to pass. Another most important feature in the project, is the establishment of a telegraphic line with Canton and the Eastern Chinese seaports, by way of Rangoon, Esmok and the Pearl Valley.

AN UNSKILFUL INSTRUCTOR.—Recently a man went in among a gang of workmen who were using the sledge, and seizing one remarked that he would show them how to use it. In swinging it about he struck it against one of his legs, instantly snapping the bone. Serving him rightly for his conceit.

AT the Charlestown, Mass., naval station, Government is building a great steamship, which is designed for wonderful speed. This vessel is to bear the name of one of the swiftest mountain streams of New Hampshire, that is, the *Ammonoosuc*.

### Great Rifle Festival.

The Swiss residents of New York have just brought to a successful close a great Rifle Festival, which was held for the benefit of the widows and orphans of Swiss soldiers who have fallen in our war. The shooting lasted from Thursday Sept. 17th, to Monday Sept. 21, and was participated in by competitors from all parts of the country. Ninety-two prizes were distributed, ranging in value from $4 to $100. The first prize was won by Mr. Rud Fasse, of Providence, R. I., who used the Burnside breech-loading rifle illustrated on page 385, Vol. VII., (new series) of the SCIENTIFIC AMERICAN. Other prizes were awarded as follows:—

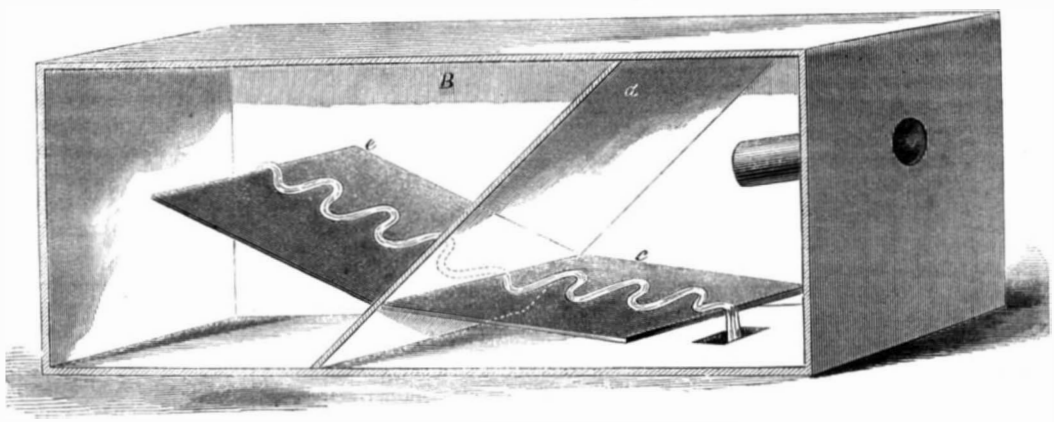
2. Mr. Knepfer, of New York, $80.
3. Mr. Raabe, of Hoboken, $70.
4. F. Friedner, of New York, $60.
5. M. Baumgaertner, of New York, $50.
6. Charles Motel, of New York, $40.
7. Fr. Parin, of New York, $35.
8. John Becker, of New York, $30.
9. Hermann Krail, of New York, $25.
10. Thomas Ducke, of New York, $25.

© 1863 SCIENTIFIC AMERICAN, INC.

## A WAY TO SHOW WATER RUNNING UP A HILL.

The plan of an invisible mirror, which produces such startling effects in the representation of a ghost, as explained on page 132, current volume of the Scientific American, may doubtless be employed to create various other optical illusions of a novel and interesting character. The following is suggested by Professor Seely, publisher of the *American Journal of Photography*:—

Set a plate glass, *a*, at an angle in a dark box, B, and fix in front of it a smooth board, *c*, with a groove along the middle, down which a stream of water may flow. It is evident that if *a* is a mirror, a person looking into the opening, *d*, will see the plane, *e*, reflected at *c*, and the stream of water will be seen flowing from its lower to its upper end.




To prevent the idea occurring of there being a mirror at *a*, a plane similar to *c* may be fixed at *e* with a groove in it similar to the groove in *c*, which may be made zigzag to complete the illusion; and this plane may be shown through the mirror before the current of water is started, or a hole may be made in the side of the box in the rear of the mirror to show the plane, *e*, at any time. The illusion will also be more perfect if the water is shown running from off the end of the plain.

## A NOVEL STEAM ENGINE.

On Thursday, the 17th inst., we examined an exceedingly novel and useful steam engine, which has recently been invented by J. B. Root, of this city. As respects its arrangement and object this engine is entirely new to us, and it achieves most excellent results. In the small space afforded in 18 inches by 10, and 12 inches high, an engine is placed which has a combined piston area equal in an ordinary engine to the power of 22.9785 horses; in practice these figures will doubtless be increased. The machine is not a rotary engine, although it is quite as compact and much more simple than even one of that class. The space is not purposely contracted, nor are the steam ports narrow and crooked, or the motions of the machine cramped to save room; but it is afforded all the space necessary for its perfect operation. The stroke of the pistons is very short, being only $2\frac{1}{2}$ inches; but even with this disadvantage no appreciable labor or disturbance is visible on the main shaft. The pistons are rectangular in shape, and are hung directly on the crank pin; they are two in number, and exert a continuous and steady pressure, when under steam, upon the main shaft. All the movements are in right lines, and no shock or jar is visible as the pistons change the direction of their motion. There is but one valve to these two engines which is perfectly balanced. It is circular in form, and has an epicycloidal movement over the valve face, and admits of any amount of lap on the steam or exhaust side without choking or compression; in brief, the induction and eduction are completely under control, from the fact that the exhaust and steam openings of the valve are independent of each other, and the time of their operation is readily controlled. This machine is in fact a twin engine (if we may use such an expression without violating good grammar), having two pistons sliding in one case, which are connected directly to the crank without the intervention of any rod, link, toggle, or mechanical agency of any kind whatsoever. The motion is as regular and free as can be, and the simplicity of its construction is beautiful to the engineer. It can be instantly reversed. A stout man may almost carry a 10-horse engine under his arm. The range of uses to which this engine may be put is very wide, and it is in our opinion one of the most ingenious applications of steam we have ever seen. One of them of the size first-mentioned is now driving a large machine shop in Twenty-eighth street, and another is at work drilling armor plates for the *Dunderberg;* the engine, drill and machine are carried about by a man to boy with all ease. We hope shortly to be present an engraving of this engine in full.

## THE TEETH---DENTAL CARIES.

At the meeting of the Odontographic Society of Pennsylvania, held in Philadelphia, in August last, several papers of general interest were read. The following is condensed from one by Dr. S. R. Screven, on dental caries:—This disease is the most destructive of any to which the organs of mastication are subject, which fact is sufficient to show the great necessity of a thorough understanding of its origin and progress. Caries is a disorganization or decomposition of dental structure, originating in all cases from mechanical, chemical, or physiological causes. To imperfect development of the teeth may be attributed two-thirds of the demand for artificial dentures. If we regard man as he is, perfection is seldom attained; consequently there is premature failure, and the teeth afford a marked illustration of this. The tendency of some parts of the body to grow old prematurely, is sometimes hereditary. Early falling out of the teeth occurs to many members of the same family about the same period of time. Those who have been fortunate enough to arrive at the age of twenty-five or thirty years without being attacked by caries of the teeth, are apt to continue through the balance of life free from its disturbance. But we notice a large majority of persons in early life with almost every description of decayed teeth—alveolar abscess, exostosis, inflammation of the gums, and a diseased condition of all the organs in general; and through life, the physician or dentist is sought to alleviate their suffering. Some writers maintain that caries is contagious; but it has been settled that the exciting causes are external, and the predisposing causes internal. A predisposing cause exists in teeth of a soft and delicate texture; those which have a yellowish appearance, and dense in structure, are less liable to it, yet all are to a certain extent liable from their limy composition. The disease is rapid in teeth of a delicate and transparent structure. An exciting external cause for caries is acids, which penetrate the enamel and come in contact with the dentine; and an internal exciting cause of caries is feeble health. The paper, as published in the *Dental Cosmos*, goes to show that much ignorance respecting caries prevails among dentists; and Dr. Flagg, one of the members of the Society, alluded to this. Dr. Wardle stated that he believed man, as now constituted, was always imperfect. He found that there were two periods during human life when teeth were predisposed to decay. The first was between twelve and eighteen years of age; and from the thirty-fifth to the fortieth year for the latter period of decay. The last development of decomposition was very difficult to arrest. Dr. Gill believed that excessive spitting was eminently injurious to health, and the integrity of the teeth might be affected thereby. Dr. McQuillan stated that very large quantities of that valuable fluid, saliva, were unnecessarily wasted by the universal Yankee nation, much to the physical detriment of the population.

## EFFUSION OF GASES—ATMOLYSIS.

In our issue of 9th Sept. we explained the laws of gaseous diffusion, and stated that the spontaneous mingling of light and heavy gases was due to their own molecular motion. But gases also come under the law of effusion, which means the velocity with which a gas flows through an orifice under pressure, such as into a vacuum. Thus a gas confined in a varnished silken bag, and connected with a vacuum, produced by an air-pump, will flow through a puncture or orifice into vacuo, with a velocity proportioned to its density, not its molecular volition. Steam, air, and all gases flow into vacuo, or into a plenum of less density, according to their pressure and specific gravities. Mr. Thomas Graham, F. R. S, whose experiments we noticed on the diffusion of gases, has also made new and interesting investigations on the effusion of gases. He permitted pure gases, and mixtures of gases to flow from a glass tube through an artificial graphite plate into a vacuum, and, as in dialysis applied to liquids, he succeeded in separating gases of different densities. The subtility of the operation will be appreciated, when we state that he has separated light and heavy gases mixed together, by mechanical agencies. This discovery has been put to practical use as a new method of analysis, and has been termed *atmolysis*. The principle may be thus stated. When a portion of air, which is composed of two gases—oxygen and nitrogen—is confined in a glass tube, with a graphite plate cemented on its extremity, and connected with a vacuum maintained by an air pump, the nitrogen—which is the lighted gas—passes through the pores of the graphite more rapidly than the oxygen, in the proportion of 1.6668 to 1. When a portion of the air in the tube has flowed out, that which is left behind contains a greater amount of oxygen than pure air. Thus, when the air in the glass tube was reduced to about one-sixteenth of its original quantity, the proportion of oxygen was increased from 21 to 23.02 per cent. With a *tube atmolyzer* formed of unglazed earthenware, such as the stem of a tobacco-pipe two feet long, set within a shorter tube of glass, and held vertically, the glass tube was placed in communication with an air-pump, and the annular space between the pipe-stem and glass tube was maintained in a nearly vacuous condition. Mixed gases were then permitted to flow into the pipe-stem and through its pores. In every experiment tried with this apparatus, the lightest gas flowed fastest, leaving the heaviest gas, in a proportionally greater quantity behind, thus *atmolyzing* the gases. With a mixture of equal volumes of oxygen and hydrogen, the latter, which is the lightest of all gases, was separated by the atmolyzer so as to leave only 5 per cent out of 50 behind. A mixture of two volumes of hydrogen and one of oxygen gas is very explosive. A spark will ignite it; a loud report and concussion will follow, and the two gases will be united chemically, forming water. Such a mixture of gases passed through the atmolyzer was rendered inexplosive, by the hydrogen flowing through so rapidly as to leave but 9.3 per cent of it in the atmolyzer. In this manner gases of different densities are separated by atmolyzers, the operations being kindred to those performed in *dialysis*. Such experiments are of intense interest to men engaged in scientific pursuits. The time of passage for gases into a vacuum corresponds very closely for each with the square root of its density. This fact has been long known. Thus the square root of the density of oxygen being 1.0515, and that of air 1, the time of passage of a constant volume of oxygen was observed to be 1.0519, that of air 1. Atmolysis is established upon this *law*.

---

A Mr. English, formerly of the Leeds (England) Fire Department, states that the Manhattan was purposely damaged by the London Fire Brigade, who had her in charge, so that she was unable to compete successfully.

---

A new iron car of the largest size has been placed on the New York Central Railroad. It was built for the American Express Company, and is said to be fire and burglar-proof.

© 1863 SCIENTIFIC AMERICAN, INC.

## HOW ENGLISH CUTLERY IS MADE.

The *Ironmonger*, an English periodical, has the following interesting article on the manufacture of table knives, &c. Some information may be gleaned from it by those concerned in similar works here :—

"We confine ourselves exclusively to the making of table and spring knives and razors. Nothing but the best Swedish iron, imported direct from the mines, principally from Dannemora, is used in the factory we are about to examine for the manufacture of the blades. The iron is converted in the usual way into steel, which is then double-sheared for table knives, and fused and cast for spring knives and razors. By double-shearing the steel, a better and sharper edge is obtained for table cutlery than cast steel would give.

"The blades are forged from the steel bars in a number of small rooms, containing each a fire-place or hearth, a trough to hold water, and another trough for the coke, which is specially prepared for its intended use ; also an anvil and hammer, and other tools. Two persons are engaged in each room: the one is called the maker or forger, the other the striker. The forger buries the end of the steel bar in the fire to the extent required, and works the bellows to raise the heat to the proper degree. When the end of the bar has thus been duly heated, it is brought to the anvil, where it is fashioned by the striker with very few strokes into a blade of the required shape. This is cut off the bar, which is then again heated for a renewal of the process. The cutting part of the blade, thus rudely formed, is welded to a piece of iron which forms the shoulder or bolster (the part rising round the edge of the handle of the knife). To make the bolster of the size and shape required, and to give it neatness and finish, it is introduced into a die by the side of the anvil, and a swage placed upon it, to which a few smart blows in the desired direction are given by the striker. The die and swage are called prints by the work-people. Besides the bolster, the part which fastens into the handle, technically termed the tang, is also shaped from the piece of iron welded on to the cutting part of the blade. After the bolster and tang have been properly finished, the blade is heated again, and then well hammered on the anvil. This operation, which is termed smithing, requires particular care and attention, as our courteous conducter informed us. It is intended to consolidate the steel, and to render it brighter. The next process the blade has to undergo is that of marking. This is done with a broad punch made of the very best and hardest steel, and having the name and corporate or trade mark of the firm carved on the bottom end or point. The blade is heated to a dull red (worm red, as it is termed by the workmen), and the mark cut in on one side of the blade with the punch by a single blow of the hammer. The mere name of the firm would be no great protection against that most detestable system of piracy which is unfortunately but too often pursued even in this country ; but the corporate mark granted by the Cutler's Company affords effective protection against piracy by English houses, as the penalties attached to the offense are rather too heavy to be lightly incurred. Of course, even this cannot altogether prevent base imitations on the part of Continental and American knaves [the English proof-reader of the *Ironmonger* must have made a mistake here ; the author certainly meant *knives*. The courtesy of the editors of the *Ironmonger* is, of course, proof against intentional insult.—EDS.] who foist their worthless rubbish upon the public abroad by forging the name and trade mark, and imitating the labels and packages of eminent Sheffield firms, like Messrs. Mappin, Rodgers, Wostenholm, and many others.

"Now comes the most important process of all, viz., the hardening and tempering of the blades. Upon the effectual performance of these depends the practical value of the articles. The Sheffield workmen have justly and deservedly acquired the very highest reputation for peculiar skill in this most difficult department of the cutlery business. The hardening of the blade is effected by heating it to bright redness, then plunging it perpendicularly into cold water, which operation renders it extremely hard, but at the same time very brittle, which is an inconvenience, of course, requiring to be remedied. This is done by the process of tempering. To this end the hardened blades are first rubbed with finely-powdered sand, to remove scales, &c., from the surface ; they are then placed on an oblong tray made of steel, and on this exposed to the fire until they are of a bright blue tint. The workman judges of the proper degree of tempering entirely by the color ; and the utmost attention is bestowed upon this point, to insure the most perfect uniformity in this respect. The hardened and tempered blades are then submitted to the manager's inspection, who applies various tests to them, and rejects any that may turn out imperfect in any one point.

"We now follow the blades that have been examined and passed by the manager to the grinding mill, or as it is technically termed, the wheel. Each separate shop in which the grinders work is called a hull. The grinding is done on stones of various qualities and sizes, according to the kind of articles to be ground. The rough-grit stones come mostly from Wickersley, near Rotherham ; the finer and smoother-grained stones, and the so-called "whitning" stones, come mostly from the more immediate neighborhood of Sheffield. The blades of table knives are ground on wet stones, the grinding stone being suspended, to that end, in an iron trough filled with water to a sufficient hight to make the surface of the fluid just touch the face of the stone. A flat stick is used by the grinder to keep the blade pressed to the surface of the stone. The ground blades are then glazed, which simply means that a higher degree of luster and smoothness is given them by grinding on a tool termed a glazer. This consists of a wheel made of a number of pieces of wood put together in such a manner that the edge or face always presents the end way of the wood, which is done to preserve the circular shape by preventing contraction of the parts. The grinding face of the wheel is covered with so-called emery cake, which consists of a composition of beeswax, tallow, and emery. The glazing wheels have a diameter of four feet. The tang of the blade is stuck into a temporary handle, to facilitate the operation. The last process to which the blades of table knives are subjected in the grinding mill is that of polishing ; this is done on circular pieces of wood covered with buff leather, with a coat of finer emery (flour emery) composition upon it, which are made to revolve with much less velocity than the grinding stone and the glazers.

The ground blades are again taken to the manager, who applies several very severe tests to them, to try their temper and edge.

We must now pay a short visit to the handle and hafting department. Knife handles are made of horn, ivory, ebony, silver, German silver, mother of pearl, &c. Two sorts of ivory are principally used—the Egyptian and the African : the latter is the more beautiful and transparent of the two, the Egyptian looking more like horn. The tusks are sawn in appropriate lengths, which are then cut by a small circular saw into handles of the required size. The handles are properly filed, and occasionally also carved or fluted in different patterns. A variety of files are used for these purposes, such as flat files, threading files, hollow files, half-round files, &c. The handle is then bored to receive the tang. The bolster of the blade having been properly filed, the tang is inserted into the bore, and fixed in by cement in the usual way. It is afterwards further secured by a German silver pin passing through the handle and tang.

The silver and German silver handles are stamped in dies. The mother of pearl handles are carved or fluted in different patterns.

The knives thus finished by the hafter are now taken once more to the manager, to undergo a final examination preparatory to their removal to the warehouse.

### RAZOR DEPARTMENT.

Razors should be made of the best cast steel, properly tilted, hammered and rolled. The value of such steel is about £60 per tun. There is no difference in the several sorts of razors as regards the quality of the steel, the same material being used for the one-shilling, two-shilling, three-shilling, and much higher priced razors. The forging of razors is performed by a foreman and striker in the same way as in making the blades of table knives. The bars or rods, as they come from the tilt and rolling mill, are about half an inch broad, and no thicker than sufficient for the back of the razor. The anvil on which the razor blades are forged is rounded at the sides by dexterously working the blade on the rounded edge of the anvil ; a concave surface is given to the sides, and the edge part thus made thinner, which saves the grinder a deal of labor. The blade having been cut off the bar, the tang is formed by drawing out the steel. The blade is then properly hardened and tempered. The last and most important process which the razor-blade has to undergo is that of grinding. The difference in the prices of blades, made all of them of the same material, is owing entirely to the circumstance that stones of much smaller diameter are used for grinding the higher-priced blades, and much more time and labor are given to the operation than is the case with the cheaper sorts. Thus, the best kind of razor-blades are ground hollow on stones measuring one and seven-eighths to two inches in diameter. A hollow-ground razor-blade of this kind may be said to be all edge, and will hardly ever require to be ground again. A very excellent and serviceable article is produced by grinding on a six-inch diameter stone. The two-shilling razors (50 cents Americau money) are ground on seven-inch diameter stones. The difference in the labor is very considerable. A grinder will turn out per week from twenty to twenty-four dozen of the common shilling razors, whilst he can manage only about five dozen a week of the better, and only a couple of dozen of the best sort.

The razors ground on a six-inch diameter stone are more suitable for hard, those ground on a two-inch diameter stone for soft beards. The more common sorts are, after grinding, lapped on the glazer, and the backs glazed and polished. The three-shilling blades are polished first, then drawn over a wood buff. Razor-blades are, in a great measure, ground on dry stones, which unfortunately causes the atoms of stone and steel to fly about freely, to the great injury of the workmen, and imparts to the whole place, where the operation is carried on, a peculiar brownish-yellow hue. The minute particles of stone and metal flying about are inhaled by the workmen, and, lodging in the lungs, produce asthma, consumption and other fatal diseases. This most dangerous feature of the dry-grinding business has, however, been very considerably modified of late by the introduction of an apparatus which, in a great measure, protects the grinders from the dust flying from the stones. This apparatus, which we saw at work at Messrs. Mappin's establishment, consists of a fan on the principle of a winnowing machine, with a flue to take away the dust from each of the stones in the room.

The difference in the price between the three shilling and the dearer razors is simply in the handles with which they are fitted, the blades being exactly the same in every respect. There are horn handles, ebony handles, plain and carved ivory handles, silver and German-silver handles, mother-of-pearl handles, &c. Some idea of the importance and extent of this branch of the cutlery business may be conceived from the fact that some 1,500 different patterns of razors are made in one factory.

There still remains now to visit one of the most important and most interesting departments of the Sheffield cutlery business, viz., that of the manufacture of

### SPRING KNIVES,

or knives that shut with a spring, to go in the pocket. The blades of spring knives are made of the best cast steel only. The ingot of steel, rolled to the required size, is placed in the hands of the forger or blade-maker, to be fashioned by him and the striker much in the same way as a table knife blade, only that the tang or joint part is cut off the steel bar along with the blade, instead of being made of iron welded on to the steel. Penknife blades are generally forged by a single hand, with a light hammer not exceeding three and a half pounds. The breadth of the striking part of the hammer does not exceed an inch, as a broader surface would not be suitable for striking so small an object as a penknife blade. In the manufacture of spring knives, the success depends in a very great measure upon the judgment and skill of the workman who forms the blade under the hammer. The forged blade cut off the bar is taken first to the grinder for what is technically termed scorching, which means simply rough-grind-

© 1863 SCIENTIFIC AMERICAN, INC.

ing the tang or joint part. The blade is also chorled or nicked in the shoulder, to guard against its cracking in the subsequent operation of hardening. It is then taken to the marker's shop to be marked in the same way as the blade of a table-knife. The little recess, called the nail-hole, or nail-mark is notched in, while the blade is still hot, by means of a chisel round on one side and flat on the other. The marked blades are now returned to the forge for the purpose of being hardened and tempered, which is effected much in the same way as with the blades of table-knives, only that the hardening heat is not raised to above a dull red heat, instead of to a bright red heat. In the subsequent process of tempering again, all depends upon the judgment of the workman, spring knife blades being tempered variously according to the different purposes which they are intended to subserve. Thus, for instance, a whittling knife is tempered differently from a penknife, &c. The tempered blades are carefully straightened; they are then returned to the grinder's shop to have the proper edge given them: after which they, together with all the other portions necessary to make up the complete knife, also with bolsters, rivets, pins, &c., for fastening the whole together, are taken to the cutler's fitting department, the most important of all. Here the knife is made up or put together. There is a separate set of parts required for every kind of knife made; and all the parts have the number of the pattern stamped upon them, to facilitate their being properly put together.

First and foremost there is the "spring," which constitutes the back of the knife. This is made of steel. It is cut out by a fly, then properly hardened by heating it to dull redness, and in that condition plunging it into cold water. It is now moistened with oil, which is then allowed to burn off in the fire. When the oil is gone off, the spring is considered to be properly tempered. Elasticity is given to it by filing; it is also filed down to the thickness of the blade for which it is intended, and bent out of the perpendicular, to give the requisite motion for the blade. It is rough-glazed on a leather-faced glazer, coated with glue and emery, and the inside of it is polished with a steel burnisher. The springs used in pocket-knives vary according to the number of blades.

Then there are the outer and inner scales, of which the former constitute the outer covering of the knife, whilst the latter form the small chambers in which the various blades fit. The outer scales are made of pearl, ivory, horn, shell, wood, or some other suitable material; the inner scales, of brass, iron, or German silver. The inner scales are hammered, to make them properly incline to the outer ivory scales. Dutch metal foil is placed between the ivory scale and the metal scale. The benefit of the Dutch metal interposed between the two scales is that it brings out the color, and imparts to the ivory the beautiful flush which it shows. The necessary holes are then drilled with a drill and bow in the scales, and also in the tangs of the blades. A longitudinal section is cut out from the ivory plate by drill and bow for the insertion of a name-plate which fits exactly into the aperture cut out, and is fastened with pins passing through holes drilled in. The scales are fastened together with German silver pins, and the nail notches are filed in. The spring is then placed with the blade fitted between the two double scales, and rough-filed level. The fitting and matching throughout require great judgment and nicety on the part of the cutler.

The fitting of the blade and spring is the most delicate part of the whole process, and requires great practical experience and the most careful and skilful manipulation. The blades are fitted in at right angles: they are taken out again and again, and it takes a good deal of filing, &c., to make them fit exactly as required. One of the principal points to be looked to, is to make the blade in shutting fall so that it does not come down upon the belly of the spring, as this, of course, would tend to take the edge off at the point of contact.

There are several branches of the cutlery business in which a few weeks' apprenticeship suffices to enable even boys to earn pretty good wages. But in the fitting department it requires an apprenticeship of full seven years to give a young man even a decent knowledge of his business.

On the occasion of our visit to one establishment, we saw a so-called double-box sporting knife in progress of fitting up. There were forty parts to be put together, the knife containing nineteen useful articles, such as a wood-saw, a cock-heel saw, a hollow gouge, a button hook, a nail-file, a pen-blade, a pocket-blade, a corkscrew, a punch, a gimlet, a sacking needle and another needle, a lancet, a picker, tweezers, a pair of scissors, and some other articles. All these articles were furnished ready-made to the fitter, with all other necessaries to put them together, yet we were apprized that it would take him ten days to finish the knife!

When matters have proceeded so far as above described, the blades and springs are sent back to the grinder, to have the tang and the outside of the springs polished; after which all the parts are fitted together, and the haft is finished. The bolsters are then carefully either squared or rounded by filing, as required. After this, the knife is buffed on a sand-buff, then finished on a gloss-buff with rotten stone and oil. The sand-buffing removes all the file-marks, and leaves a dead surface; the gloss-buff gives high polish and finish.

The fine grinding was formerly done on dry stones, which, however, was found to overheat and deteriorate the blades; they are now fine-ground on wet stones before lapping. The plain-ground pen-blades are ground hollow on grinding stones, the pocket blades are glazed on emery buffs. The shoulders of the blades are then ground on a lead lap, by which means they are got perfectly sharp and regular. A lead lap will give the very finest shoulder—finer, indeed, than could be obtained with any other material. The operation is termed lapping, most likely from the circumstance that lapidaries use a similar contrivance in their business. The blades, cleaned previously from grease by warming before the fire and wiping, are polished on leather and cro cus; this is done by boys with very nimble fingers, who earn excellent wages at the work. After this the finished knives are taken to another department, where they are sharpened on Welsh hones. They are then finally cleaned, and sent to the warehouse.

Some notion of the immense extent to which this branch of the cutlery trade has grown at present, may be formed from the fact that one firm manufactures some 12,000 different patterns of spring knives, many of them, moreover, with several variations.

### The New Iron-clads in England.

The following information concerning the iron-clads now building in England for the rebels, is timely and interesting; it was furnished the *Tribune* by a passenger on the *Scotia*:—

"Two 2,000-tun iron-clads, combining the ram and Monitor principles, are being built by Laird at Birkenhead. One of these is already launched. They are plated with four-inch iron; they each carry two turrets, twelve inches thick, and have formidable rams projecting from their stems. Each turret will carry two 2000-pounder rifled guns, and each vessel will be armed in addition with two 100-pounder stern-chasers. The guns were ready at Preston, Lancashire, and would be shipped and put on board in the Irish Channel. The ram which was launched was expected to sail within four days after the *Scotia* left, and the second would be launched by the time the first sailed.

"The destination of these powerful vessels was reported to be the United States; but nothing definite was known on that subject. In order to facilitate their speedy completion, work was kept up on them day and night, several gangs being employed to relieve each other throughout the twenty-four hours.

"Ram No. 1 was launched under the French flag, permission for that purpose being given by the French Consul at Liverpool. And what is more, the craft still flew the tri-color when our informant left. The destination of these vessels is well known to the British Government. Our agents have closely followed them from the beginning, and the evidence accumulated of their contraband character has all been laid before the ministry. Yet, thus far, no effort has been made to restrain them from sailing.

"But these are not all the offensive preparations now in progress against us in 'neutral' Great Britain. A large iron-clad sloop-of-war is well under way in the yard of a Liverpool ship-builder, whose name our informant has forgotten, and five others of a very formidable character are in course of construction on the Clyde. One of these, now building by James and George Thomson, over four thousand tuns burden, will have four or five inches of iron plating upon eighteen inches teak. She will not, however, be ready to sail for some months. On the day before the *Scotia* sailed, the captain of Ram No. 1 was heard to state at the Adelphi Hotel, Liverpool, that he would command that vessel. He remarked, in conversation, that he was a Southerner and a rebel; but more discreet than Maury and Sinclair, he refrained from going near the iron-clads, so as to avoid bringing suspicion upon their destination."

### Steam Power for Circular Saws.

Messrs. Editors:—I noticed in a late number of the Scientific American, that a correspondent in Tioga county, Pa., stated that 40-horse power was required and used in that section of the country for running a 4-foot circular saw. I think he must be mistaken. I have had much experience in saw mills, and have followed the business of putting up mills, engines, and other machinery for upwards of eighteen years. I am now running an engine which has a cylinder of 16 inches bore and 24 inches stroke, m aking 95 revolutions per minute; supplied with steam from three boilers, each 24 feet long, 3 feet in diameter, and two flues of 13 inches. The pressure of steam carried is from 75 to 80 lbs. on the inch. I cut white wood, bass wood, walnut and oak, and the engine drives two circular saws, 66 inches diameter, 520 revolutions per minute; two edger saws, 24 inches diameter, 1,500 revolutions per minute; two cut-stuff saws, 24 inches diameter, 1,200 revolutions per minute; and one upright saw, 26 inches stroke, 280 strokes per minute. I cut daily from 35,000 to 45,000 feet of stuff, varying from five-eighths inch to five inches in thickness. I require more steam than I can now obtain from my boilers, but not to obtain 40 horse-power for a 4-foot circular saw. A. F. Ward.

Chatham, C. W., Sept. 14, 1863.

[With an average steam pressure in the cylinder of 80 pounds on the inch, the actual power of our correspondent's engine is 139 horse-power nearly. But in all likelihood the pressure in the cylinder will not exceed 60 pounds on the inch, in which case the power of the engine will be about 104 horse-power. Of course circular saws may be run with engines and water-wheels of different degrees of power; cutting the stuff according to the power employed.—Eds.

### Illinois State Fair.

The farmers of Illinois are highly distinguished for enterprise and the encouragement of improvements in agricultural mechanism and implements. The Fair will be held in the city of Decatur, and will commence on the 28th inst., and will last six days.

The able Corresponding Secretary of the Society, John P. Reynolds, Esq., says, respecting inventors:—"Our farmers are so dependent on machinery for farm culture, and the prairies are so well adapted to its use, that we are beginning to grow inventors as a regular crop."

Our Western farmers deserves a large amount of credit for the ingenuity and energy which they have displayed during several years past in devising improved machinery for every farming purpose.

Value of Architectural Photographs.—In a report from the Council of the Architectural Museum, South Kensington, England, on the formation of a National Museum of Architecture, they remark, "It is impossible for an architectural museum to have too many photographs. Cheap and comprehensive as they are, they are always worth collecting, and any fastidiousness as to their acquisition would be misplaced. There is hardly a new building now undertaken which is not photographed at the instance of the architect, or the employer; and an understanding might easily be established that it was expected that a photograph of every new construction, possessed of any architectural character, should be deposited in the national collection."

The use of the ramrod in drilling troops has been forbidden in England. Reason—the steel ramrod causes the wear of rifled barrels by its friction.

© 1863 SCIENTIFIC AMERICAN, INC.

### Farmers versus Mechanics.

The following remarks from the *New England Farmer* commend themselves by reason of their practical nature and good sense; they show an appreciation of the true nature of the difficulties complained of:—I have occasionally read the advice for farmers to have a shop, with a set of tools sufficient for ordinary carpenter's work. The advice is good, but farmers, at this age, ought to go further, and study into the machinist's trade some, for so many machines are now being made to perform farm work, it is getting to be absolutely necessary to know how to use them. Often good machines are condemned, when the fault is a want of knowledge of how to use them.

I know a man that bought a mowing machine who cut a large lot of hay with it, and liked it. At last he broke the cutter-bar, got it repaired, broke it again, again put it in order and asked a friend to try it who had some mechanical gumption, but before he got the "hang of it," it broke again! What was the difficulty? Nothing, only the journal next the crank had never been oiled, being out of sight, under the seat! The result was, that the journal rapidly wore into an elliptical form, and smashed things up, as has been described. Now, the man does not like that kind of mower!

The machinist will fit up a mower nicely—the shaft running free when cool—the farmer takes it into the field, where it goes well a little while, then the team begins to sweat, and pull hard, and the machine is pronounced a hard-going thing, while all it wants, perhaps, to make it go easy, is the slight slacking of the cap bolts in some place, or a few drops of oil.

A little fat of dead animals will save a great deal of fat in live ones. In oiling, never use whale oil, such as is often burnt in the house; it is worse than nothing in a little time. I use the best of sperm oil; there may be other good lubricators, but none are good that gum.

Now a few words on the strength of metals and power machines. These should be used by farmers, for most all good land is more or less infested with rocks or stumps. Machines to remove these must have an immense concentrative power; if they have this, and are fastened to an unknown resistance by ignorant hands, their own power will be used for their own destruction, the operator not knowing how trying it is to metals to have the least jar or concussion, when under great tension. Besides, it never does any good, when drawing rocks or stumps, to jump or spring; it will only break something. The blacksmith sets his cold chisel into a large bar of iron, and marks it all around: this produces a great tension in the uncut portion; a sudden jar with a blow of his hammer will break it, showing the importance of a steady draft when there is a hard pull. I have seen thrashing kind of men breaking things to pieces, who had not sense enough to know that rocks and stumps cannot be jumped out.

I saw some time ago, the observations of some person who had been on the farms in Connecticut. Among other things was a machine for pulling rocks. By his description it was Bolles' patent. He went on to say how good it was, but farmers could not get them, because the exorbitant price of $225 was charged for them, when they could be made for $60, and leave a good margin for profit. A man so entirely ignorant of what he was writing, should not have shown it, to make farmers think that he knew, and give the impression that mechanics were asking too much for their work. The fact is, if that man should take three times the amount he named to build one of those machines, he would have "nary a red" or a nickel left when it was done. No; we farmers get our machines cheap, thanks to the skill of our mechanics, who arrange their shops with such ingenious labor-saving tools, that they can duplicate our implements at a wonderful rate. Add to this the competition, and we have nothing to complain of. Then, again, farmers ought to know how to calculate the value of labor-saving machines, and designate between the good and worthless. Some farmers plod along and will not use what they call "new-fangled notions," when there are implements that save their cost every year for several years. Some men use hand tools, and think they are economical, when, if they had thrown them away long before, it would have shown that they understood economy. I mean those tools that lose their capacity, and which, after a certain amount of wear, should be put aside. It is not economy for a strong man to use a shovel after two inches has been worn off, or any other tool that has lost twenty-five per cent of its original capacity.

### A Method of Hiving Bees.

Take a smooth dish with a handle and carefully lift a portion of the bees from the thickest part of the cluster, and turn them down in front of the hive—let this be done again and again until a quart or two of the bees have been removed—by this time they will commence to call the others to their new domicile by humming in and out and making a continuous buzzing sound with their wings. If the bees are then so scattered that the operator can do nothing more by dipping, and those at the hive continually buzzing, he may take a handful of grass, or a bunch of leafy twigs, and strike them lightly, until they are all driven from the spot of clustering. They will then make a few circles in the air, and alight at the call of the others in front of the hive. If the queen is with them, they will soon all go up, become quiet, and may then be removed to the stand. If an apiary is near large and high trees, the bee-master will often have considerable difficulty in hiving his swarms; yet if the spot upon which they have clustered can be reached by a ladder, the bees may be hived, although upon a large limb, or even upon an elevated portion of the body of the tree. In such cases the hive may be brought near the cluster by elevating it upon a table or stand. The swarm should then be saturated with the sugar-water in such a manner as to moisten the greater part of the bees; this will not only render them good-natured, but it will increase their weight and prevent them from being able to fly until the fluid has been evaporated or swallowed by the bees; then let the operator take a light box and dipper, ascend the ladder a second time, and dip off the greater part of the bees and put them into the box, which he should hold with one hand during the operation of dipping with the other. When the greater part are in, he may come down quickly and empty it in front of the hive. The remainder of the bees upon the tree may then be disturbed with the bunch of grass as before directed, when they will soon leave and join their fellows at the hive.—*Colonial Farmer.*

### Lecture on Preserving Vegetable Substances.

On the evening of the 9th inst., a lecture prepared by Professor James C. Booth, the distinguished chemist, was read before the Horticultural Society, Philadelphia, on the preservation of vegetable substances as food. He stated that "Many practical men greatly underrate the value of chemistry: but the chemist can prove that chemistry will inevitably play an important part in cultivating the products of the soil. Horticulture deals almost exclusively in organic life. The soil performs important functions in the growth of plants. The art of modifying their growth so as to obtain this or that vegetable principle, contained in the leaf, root, stem, or fruit, in greater quantity and of better quality, is an art as yet in embryo. There is a great void in the application of chemistry which only time can fill up. Oxalic acid is now wholly made from molasses, and essential oil of mustard has been made artificially. Oil of turpentine has been changed into agreeable oil of lemons; bituminous coal vies in its productive distillation with the modern vegetable kingdom. The dyes recently made from coal indicate that indigo blue will, at no distant date, emerge from the laboratory quite as perfect as from the indigofers. Quinine will be supplied to the medical profession by the manufacturing chemist. There are two modes in which the products of organic life, destined for food, may be preserved unaltered, or nearly so, for a lengthened period of time: 1st, by the exclusion of moisture; and 2d, when the moisture is present. The first mode has been used from the earliest times, though it has only recently received an impetus. The patent of Masson, as contained among the English reports of patents, for Nov. 12, 1850, gives a more detailed view of the process. Its main operations are evaporating water by artificial heat, and compressing it into so compact a mass that the air in the interior of the chemical charge can only affect the surface of a mass of organic matter.

"Dried fruit was first used in the Crimean war, as a reliable article of diet for the soldier, by the Russians and the Allies. Delafield's Report on the Art of War in Europe, 1854-'55,-'56, specifies some details. The French were supplied with 7,894,920 pounds avoirdupois, exclusive of hospital supplies, and the proportions were: Dried vegetables, 424,-600; compressed vegetables, prepared by Chollet, 752,120; conserve of beef, 6.718,140. Total, 3, 947 net tuns. Of the conserve, 888,300 pounds were in powder, or finely-ground gelatine. At Chollet's, the vegetables were cut into thin slices, dried by heat, and compressed. The second method to preserve food is with its moisture. Mold is a plant of fungous character, and operates strongly in decomposition.

"Decomposition may be prevented in two ways, either by heating the substance in a large vessel and boiling, or nearly so, and then transferring it while hot to glass or stoneware jars, or tin cases, which are immediately sealed, or by putting the substance, with sufficient liquid, water, or syrup, directly into the jars, closing them air-tight, and then heating the jars in a water-bath. The latter is the most certain method. At the close of the lecture, some specimens of ground artichokes, for frying, leeks, cauliflower, cabbage, tomatoes, potatoes, &c., such as were used in the Crimean war, were exhibited."

### Coal-cutting by Machinery.

Owing to the difficulty of obtaining workmen for the Pennsylvania mines, the cutting of coal by machinery instead of by hand labor, is a subject of considerable interest to the owners of such property, and the public in general. In England, the application of machinery in this way appears to be progressing. There is one machine said to be in successful operation at the Balaclava Colliery, near Leeds, and another has just been finished in London, as we learn by the *Miner's Journal*. It is 3 feet long, 1½ feet wide, and 2 feet high; weighs half a tun, and is mounted on flanged wheels, to run upon a tramway. A six-inch cylinder operates a pick connected to the extremity of its piston rod. It can be shifted to give either a right or left hand blow, about 100 of which it can give per minute. Compressed air is employed to operate the pick in cutting, hot steam being totally unsuited for working machinery in the confined atmosphere of a coal mine.

### Substitute for Wax.

For the purposes of perfumery, waxing thread and polishing furniture, Mr. B. L. Proctor presents the following table of substances, in the London *Chemist and Druggist*:—

| | For Thread | Furniture | Perfum. | Melt. Pt |
|---|---|---|---|---|
| Genuine block white wax. | Good | Good | Good | 145° |
| White cake wax (adulter.) | Medium | Medium | Good | .. |
| Jamaica yellow wax..... | Good | Good | Good | .. |
| English ditto..... | Good | Good | Good | .. |
| Spermaceti..... | Bad | Bad | Good | 112° |
| Stearine..... | Bad | Bad | Good | 144° |
| Tree wax (Japan)..... | Med. Good | Medium | Good | 115° |
| Insect wax (China)..... | Med. Good | Medium | Good | 118° |
| Carnauba wax..... | Bad | Good | Bad | 192° |
| Paraffine..... | Med. Bad | Bad | Bad | 131° |

The quality of some of these materials is subject to considerable variation; thus, paraffine may be obtained quite free from odor; and, if so, might possibly be used without disadvantage in the preparation of cold cream or pomades.

To Housewives.—One of the best bleaching and emollient agents that can be employed in washing, either the person or clothing, is common refined borax. It should be dissolved in hot water at the rate of half a pound to ten gallons; a great saving in soap is effected by its use. The borax should be pulverized first. It may be procured in the form of crystals at any druggists, and can be powdered with a rolling pin, or a hammer; it will not injure the most delicate fabric; and laces or other fine tissues may be washed in a solution of borax, with manifest advantage to their color and consistency.

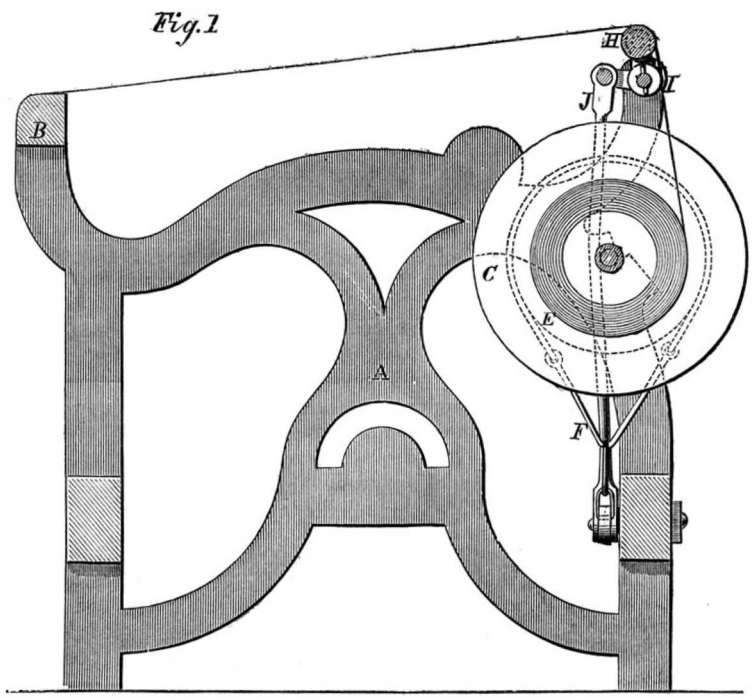
Immense Strawberry Crop.—A single fact relating to the strawberry crop of the past season will doubtless astonish many of our readers. A prominent fruit-grower of Western New York, from a single patch of sixteen acres, sent to market thirteen hundred bushels of strawberries. The entire crop was sold at an average price of one shilling per quart, realizing the snug sum of five thousand two hundred dollars, as the product of sixteen acres of ground. This may be taken as an instance of the profitableness of thoroughly scientific fruit growing.

© 1863 SCIENTIFIC AMERICAN, INC.

### Improvement in Power Looms.

This invention consists in a novel and simple method of combining the whip roll with the weighted levers employed to produce friction upon the yarn beam, whereby the letting off of the yarn is controlled by the tension of the warp, and the said tension kept nearly uniform whatever the quantity of yarn on the beam. The following is a description of the several parts. In Fig. 1, section, A, is the frame of the loom, B, the breast beam, and C, the yarn beam, having the journals of its shaft running in boxes as usual. The two friction straps, D, are each fitted to a drum, E, on opposite ends of the shaft; said drums being formed on the heads of the yarn beam. The iron links, F, connect with the ends of the leather straps, and also with the weighted levers, G, at the bottom, in the section of the loom; these weights are not shown as they would hide more important parts. The whip roll, H, has its journals fitted to bearings in the arms of the right-angled lever, I; the roll runs in the top of the upper arm, while the other end of the lever is connected with the loaded lever, G, below by the rod, J. The effect of this arrangement is, that the weights hold back the whip roll, and therefore act in opposition to the tension of the warp, which naturally pulls the said roll forward. The weights are so adjusted to the desired tension in weaving that they will just balance the tension of the warp, and hold back the whip roll as far as permitted by the friction straps; these latter prevent the descent of the weighted levers beyond a certain position. The points of connection of the straps and levers are at such distances from the fulcrums of the right-angled levers, I, that the weights produce an amount of friction that would act as a positive stop if the whip roll occupied a fixed position, independent of the yarn beam, as it does in most looms. While the warp has no more tension than it should have, the friction straps prevent the beam from turning; a very slight increase of tension draws the whip roll forward, and raises the weighted arms through the agency of the rods and levers between them. This relieves the friction straps of weight and the yarn beam of their embrace, and allows it to turn and reel off more yarn, until the proper tension of the yarn is restored, when the weighted levers again overcome the action of the warp on the whip rolls and operate upon the yarn beam to prevent further letting off. A patent for this ingenious device was granted through the Scientific American Patent Agency, to Thomas H. & Henry James, of Stockport, N. Y., on Jan. 28, 1862; for further information address Henry S. Vandecarr, assignee of the patent, at that place.

*Fig. 1*




JAMES'S LET-OFF MOTION FOR POWER LOOMS.

### A New Submarine Machine.

One of the torpedoes lately placed in the waters of Stono Inlet, South Carolina, for the purpose of blowing up our gunboats, was picked up by the mortar schooner, *S. R. Williams*. The machine is about twelve feet long, is composed of tin and zinc, and when loaded floats upright in the water. There are two cylinders connected by a tube, the lower cylinder containing the powder, while the upper cylinder acts as a float. All that appears upon the surface is a small piece of board connected with an old musket within a foot of the water. Any contact with this board discharges the musket and "up she goes." The cartridge of the torpedo contained ninety pounds of powder wrapped in a Charleston paper of August 1, 1863, showing the article to be of domestic manufacture.

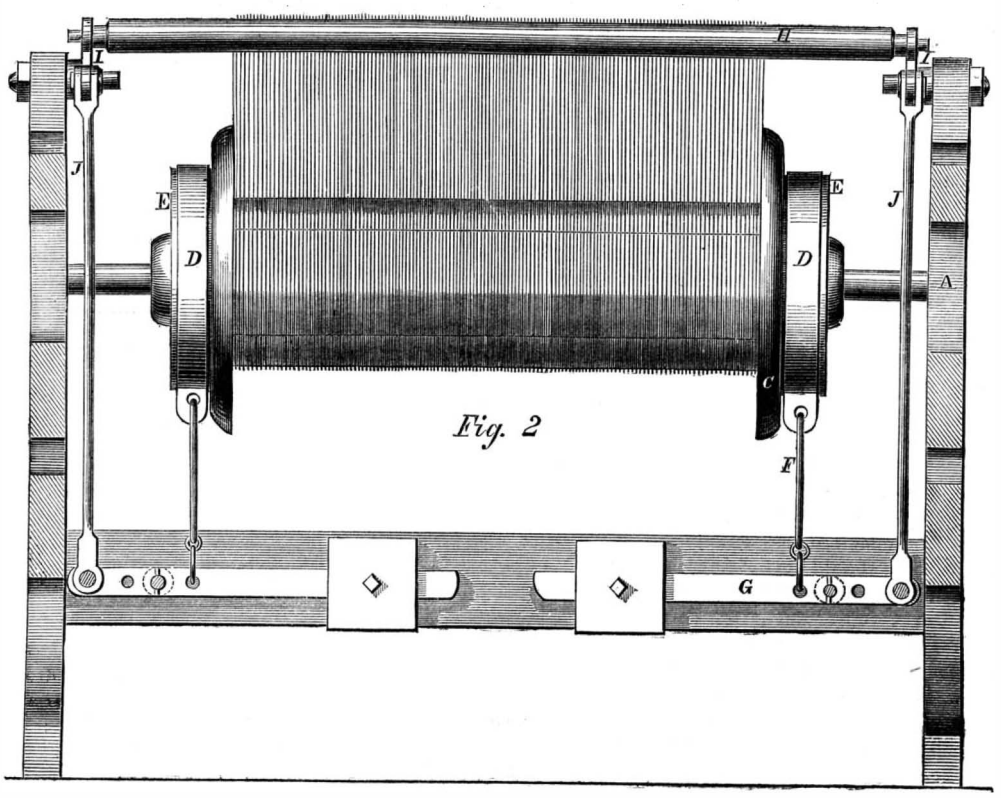



*Fig. 2*

BALL-AND-SOCKET BEARING FOR BRASS JOURNAL BOXES.—The brass boxes on the large connections of the engines on all the new gun-boats, side-wheel double-ended ships, and those in some sloops-of-war, have a ball-and-socket bearing in the ends of the rods and straps to which they are attached. As a consequence they work much easier (being mostly short connections), and we have yet to hear of a single crank shaft, or more than one (the *Pembina*, we believe, broke hers), breaking on any of the engines so fitted; these boxes would be a good feature on locomotive engines.

THE Coney Island R. R. Co. are about introducing steam on their road; they received three cars with engines fitted to them recently.

### A NOTICEABLE FEATURE OF THE FAIR.

In the course of our visits to the Fair of the American Institute now going on in this city, we had occasion to remark one feature which we have briefly alluded to on a previous occasion; that was the popularity of the Scientific American Patent Agency with the inventing public. We took a casual review of the number of patented articles in the Exhibition which have passed through this Agency, and readily counted over 75 different machines and patented articles without moving very far from our point of observation. These were not, by any means, the whole number that were on exhibition; and we only mention it incidentally in connection with the voluminous correspondence we continually receive to the same effect. Similar features we are confident could be observed at every mechanical and agricultural fair in the country. We are not disposed to claim an undue share of eminence in this respect, but facts are stubborn things and speak for themselves. In this connection we take pleasure in publishing a letter from a client, it being the first thing our eye rested on after penning the above:—

MESSRS. MUNN & Co:—I have the pleasure of acknowledging the receipt of your favor of the 10th inst., informing me that my application for a patent on my Salt Box had been allowed. I therefore enclose to you the balance of the Government fee, and $1 subscription to the SCIENTIFIC AMERICAN for four months.

For the last ten or twelve years I have been a constant reader of your valuable paper, and have ever taken great pleasure in recommending it to my friends as the most reliable and valuable scientific journal printed in this country; and through my influence you have received many subscribers. Influenced by the valuable knowledge I have received from its columns, I became a patentee, and have, through your Agency, made six applications for Letters Patent. Please accept my best thanks for the able and satisfactory manner in which you have transacted all of my business with the Patent Office. I shall continue to recommend your Agency to all who take an interest in patents, as you are, in my opinion, the most practical, reliable, and successful patent attorneys in the United States.

C. P. CROSSMAN.
West Warren, Mass., Sept. 20, 1863.

SEX OF EGGS.—Chas. H. Grower, of Long Island, says in reference to M. Genin's plan for determining the sex of eggs, that, wishing to have a number of cocks, he put a dozen eggs with rough ends under a hen, and two males and seven females were hatched out. And that if the air bubble is in the centre of the end of the egg, a male bird would be produced, or, if slightly at one side, the egg would give a female, he tried 15 eggs selected as male, and the result was 7 males and 6 females.

FIVE men and a single team, cut, bound, and shocked an acre of heavy wheat in forty-one minutes!

© 1863 SCIENTIFIC AMERICAN, INC.

# The Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY

At No. 37 Park Row (Park Building), New York.

O. D. MUNN, S. H. WALES, A. E. BEACH.

TERMS—Three Dollars per annum—One Dollar in advance, for four months.

Single copies of the paper are on sale at the office of publication, and at all periodical stores in the United States and Canada.

Sampson Low, Son & Co., the American Booksellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN.

☞ See Prospectus on last page. No traveling agents employed.

VOL. IX, NO. 14...[NEW SERIES.].....*Nineteenth Year.*

NEW YORK, SATURDAY, OCTOBER 3, 1863.


## AMERICAN COPPER.

There was a period in the history of the world when iron was unknown in the arts. The utensils and armor of the most civilized nations in those days were made of bronze—an alloy composed of copper and tin. After the discovery and application of iron and steel, the use of copper and bronze declined for many purposes; because steel and iron were stronger, and could be produced at a much less cost. No one can over-estimate the value of the general application of iron in the useful arts. But copper is also a most valuable metal, and for some purposes it has no equal. In the art of electro-metallurgy it occupies the front rank as a conductor, and it still forms the chief material of most alloys. For metallic statuary, and brass in all its various forms, it is the principal metal employed, and the demand for it is on the increase. Iron is so subject to corrosion, especially when exposed to a saline atmosphere, or to the action of salt water, that copper is preferred to it as sheathing for ships and for many other purposes, where durability and not strength is the main object. It is also used exclusively for the great pans in sugar refineries, as also the stills in spirit distilleries; and with the increase of all classes of manufactures and chemical products, an increased supply of copper is also required. The copper regions of the United States are of great extent, and the metal of the Lake Superior mines is the best in the world. The present yield of the mines of this region is about 8000 tuns per annum; this amount being twelve times greater than the yield ten years ago. The total annual copper product of the world is about 70,000 tuns, Chili supplying 16,000 tuns, and Great Britain 17,000 tuns; but in the latter country, about 32,000 tuns are smelted annually from native and foreign ores, and 25,000 tuns of the metal are exported.

The Americancopper mines are but in their infancy, and their future prospect is cheering; for the ores are perhaps the richest on the globe. Nowhere have such masses of pure copper been found as in the Lake Superior district. And we learn from the *California Farmer*, ofthe new mines in Calaveras county, in the district called Copperopolis, that the ores of that region are second to none in richness, while they far surpass those of England. Five mines have been opened, which have been worked by skilled Cornish miners, and many thousand tuns of ore have been brought to the surface. The best ores are said to yield about 26 per cent of copper, and one of the mines now forwards about fifteen tuns of picked ore daily. If copper could be produced at less cost, far more of it would be used in the arts. Attention should therefore be directed to improvements in mining and refining this metal so as to reduce its cost. Were it not for its great price, the bronze made of copper and aluminum would be employed for making parts of marine engines, as a substitute for wrought-iron, because it is much stronger than that metal, while it is also proof against corrosion by salt or fresh water. In the Newcastle district, England, sulphuric acid is now manufactured in large quantities from sulphurets of copper, instead of the crude sulphur formerly imported from Sicily. After the sulphur is driven off by heat, the waste or ash is smelted for its copper, and the operation yields a profit, with ash containing only two per cent of metal. Cheap coal is the prime agent for smelting copper ores economically, and this can be obtained in several sections of our country. So far as we have been able to ascertain, there are six copper-smelting establishments in the United States, namely, at Detroit, Mich.; Cleveland, Ohio; Pittsburgh, Pa.; Baltimore, Md.; Boston, Mass.; and New Haven, Conn. This is a large number, considering the short period since copper became an American product of any consequence; but with our great natural resources of rich ores, our smelting establishments should turn out 16,000 instead of 8000 tuns annually, within five years.

## KEYING WHEELS ON SHAFTS.

Wheels in machines are secured to shafts by different methods, such as forcing them on, by keys, by nuts and washers, and occasionally by rivetting; keys are more generally employed than any other device, being the surest way of preventing the wheel from turning, working off, or becoming loose, when the respective key-ways are well made and the key properly fitted. We have been requested by various correspondents, at different times, to inform them where they could procure a work on key-ways, one which treated of the relative proportions for different sizes of wheels and shafts, and other general particulars which the experience of the author might suggest. We do not know of any, nor do we think such a work would be likely to meet with a ready sale; besides which it would not be at all easy to lay down rules, or laws, for definite instructions in a case where so much depends upon practical knowledge. The principle of a key is that of a wedge, and it secures the wheel mainly by that force; how far the taper of the key should extend, and what material should be used for it, are matters which must depend wholly upon knowledge acquired by observation. In nearly all cases steel is preferable for small keys; but in some situations soft iron is better than the former, for the reason that it affiliates, or hugs, the shaft closer than a harder and finer-grained metal would. The sea-going steamers out of this port have large keys in their paddle shaft centers, by which they are held in place. It was at one time the practice to cast the eye or hole of the center octagonal in shape; each plane of the octagon being truly filed to a bearing; the shafts also had corresponding planes, and when the keys were driven they were placed alternately with reference to the head and point; one key being driven from the right, the next one from the opposite side. In this way the center was keyed up truly all round; the keys were large slabs of wrought iron, from 14 to 20 inches long, by 4 inches wide, and 1 inch thick; the taper or "draught" allowed on these was not more than $\frac{1}{16}$th of an inch; in some cases not so much. This plan of securing paddle-wheel centers has now been measurably done away with, as it was costly and not at all reliable, so many keys being used that one took the strain off the other, and some invariably worked loose. The method now adopted is to use one, or at most two, large and heavy keys. The center is cored out in the foundery, so that only half of the circumference of the shaft hole has to be bored; this half is accurately bored to fit the turned boss on the shaft, and the keys are fitted to ways cut in the cored-out part of the center; when they are driven, therefore, the bored part fits the shaft, and is forced into the closest contact with it. This plan is now generally pursued on all large steamers.

The hold of a key depends so much upon its fit and taper that, as we have remarked, individual experience must be the guide to success; but it is not amiss to assert that very little taper is necessary, and that beyond a certain amount the tendency of it is to split the wheel and cause it to work off. The wheel should fit nicely and then there will be still less strain required to retain it in place. In all cases gib-heads to the keys are a convenient means of drawing them out when such a course is necessary. We believe that car wheels are now pressed on, in the very best practice, and this will be found a good plan in most cases for other work. Besides being cheap, it is safe, although there is always a bursting strain on the hub which tends to weaken its endurance. Seats too deep and others too shallow in the shaft and wheel are to be avoided; the latter soon works off the corners where wheels are not well fitted, and the former makes unnecessary work and looks badly. In all cases the key must be proportioned to the work or duty the machinery is to sustain, and this proportion must be learned by observation, and an exercise of the laws of common sense.

## HARBOR DEFENSE.

We have adverted to this subject before, in previous numbers of the SCIENTIFIC AMERICAN, and consider that it is one that should be kept prominently before our people. Certainly before the world of inventors. All the other large cities on the Atlantic coast are taking some steps to protect themselves; and although a million of dollars have been granted by the Legislature of this State for the purpose alluded to in the caption of this article, we have yet to hear of the first movement made toward a consummation of it. The idea is simply this: the harbor of this city, as of all other cities, must be rendered susceptible of immediate and impenetrable obstruction; and yet the barrier must be such that it can be as quickly removed when the occasion requires it. To climb into a block house and then pull up the ladder, or to run out on a tongue of ice and saw ones self off from the main body is not expedient nor desirable; yet this we should do in effect if we blockaded our own harbor so that if the enemy could not enter, neither could we go out to attack, and the remedy wonld be equally as bad as the disease. With none but inventors can a successful plan for defending harbors originate. And at this moment, when it seems as though the interests of every Government on the face of the globe were clashing with each other, some active steps are required to effect a thorough defense of the ports of the United States. Let us not rely too blindly upon the monitors; they are not ubiquitous, and we have no more of them now than we require for other purposes; but every person, whether a professional inventor or not, should set himself to work to devise a complete and efficient harbor defense, on the basis mentioned in this article. They may rely on the Press to give publicity, so far as known, to their efforts; and such plans as are sufficiently practical to be adopted, will be sure to secure the inventor both lasting fame and fortune.

## PATENT OFFICE REPORT FOR 1861.

We have before had occasion to notice the progress of the engravings for this work, under the auspices of Messrs. E. R. Jewett & Co., of Buffalo, N. Y. We are now able to announce the entire completion of their artistic labors. As soon as the letter-press is finished at Washington, we presume the Report will be issued to the public. We are under obligations to Messrs. Jewett for two handsomely-bound volumes containing proof-sheets of the engravings above referred to. They embrace all the patents of 1861—over three thousand in number, and the beautiful manner in which they are executed reflects the highest credit upon the contractors. It ought to be a matter of great satisfaction to the Commissioner of Patents that he has been enabled to command the assistance of artists who possess the skill and the will to execute their work so faithfully. The engraving of the Report for 1862 is now being done by Messrs. Jewett.

PATENT FOR NEW ORLEANS—RETURN OF A PRODIGAL CITY.—We have just procured the grant of a patent for a resident of New Orleans, it being the first for any inventor in the Crescent City since its return to loyalty. We look upon this event as a cheerful token of returning reason, and faithful allegiance to the old and legitimate Government. Prior to the rebellion we did a large amount of business for inventors in New Orleans and other places in Louisiana, the suspension of which, for over two years, has been most injurious to them.

PANAMA HATS.—Guyaquil is the great depot for Panama hats, eight hundred thousand dollars' worth being sold annually. The grass of which they are made, is found chiefly in the neighboring province of San Cristoval. They can be braided only in the night or early in the morning, as the heat in the day-time renders the grass brittle. It takes a native about three months to braid one of the finest quality, and I saw some hats which looked like fine linen, and are valued at fifty dollars apiece, even here.

© 1863 SCIENTIFIC AMERICAN, INC.

## RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list :—

*Engine.*—The principal feature of this invention consists in the combination of two pistons, one of which is hollow and fitted within a parallel-sided box (which may be termed the "cylinder" of the engine) in such manner as to be capable of a reciprocating rectilinear motion therein, and the other is fitted to the interior of the first one in such manner as to be capable of a reciprocating rectilinear motion therein, in a direction at right angles to the first-mentioned reciprocating rectilinear motion, and the inner one is connected directly with a crank. In an engine to be used as a motor the steam or other fluid from which the power is obtained is admitted by a suitable valve or valves to the outer box or cylinder and to the interior of the outer piston, in such manner as to act first on one and afterward on the opposite side of each piston, and to commence operating on either side of one piston when the other piston is at half stroke, so that it acts upon both pistons at once to produce a rotary motion of the crank, which is thereby made to transmit the power without ever being at a dead point. In a pump the motion of the crank produced by a suitable application of power to its shaft, sets the two pistons in motion at right angles to each other, and the water or other fluid is thereby drawn into and expelled from the cylinder and outer piston through a suitable valve or series of valves. The invention also consists in a mode of preventing the leakage of steam between the surfaces of the sides of the piston and the cylinder heads of the engine, and of compensating for the wear of those parts of the engine. John B. Root, who may be addressed care of J. L. Jackson, 168 East Twenty-eighth street, New York city, is the inventor of this improvement.

*Copper Water Heater.*—This invention relates to an improvement in the construction of copper water heaters, such as are applied to, or connected with, cooking ranges. These heaters have hitherto been constructed by bending the main portion or body over a proper cylinder or former, and then brazing the ends together and securing heads to the cylinder by rivets and soft solder, and sometimes by the latter alone. This mode of construction is attended with the difficulty of liability to leakage. The soft solder soon peels off and admits of the escape of steam or water. This invention consists in constructing the heater in such a manner that its ends may be secured to the body or main portion by brazing, thereby forming a strong and durable heater. A. C. Brownell, of Brooklyn, N. Y., is the inventor of this improvement.

*Machine for Printing Addresses on Newspapers.*—This invention relates to certain improvements in that class of machines for addressing newspapers in which the different addresses are set up in a galley to which automatic motion is imparted after each stroke of the machine, whereby a new address is brought in the proper position to be printed upon a paper that may be forced up against it. The printing is effected by a reciprocating plunger, provided with a projection which forces that part of the newspaper which is to receive the impression through an aperture in a spring shield up against the type in a self-adjusting galley, in such a manner that only that portion of the type in the galley which is opposite to the aperture in the spring shield comes in contact with the newspaper, and consequently only one address will be printed on each paper, and that by the action of the spring shield the paper having received the impression is separated from the type and caused to drop down upon a platform, from which it is swept off into a bag or other receptacle by the action of the machine. D. Fuller, of Cherry Valley, Ill., is the inventor of this improvement.

*Manufacture of Iron and Steel from the Cinders of Furnaces.*—This invention relates to the manufacture of iron and steel from the cinders of puddling, reheating and refining furnaces. It consists in mixing with the cinders in a pulverized state, a quantity of fresh-burnt lime and enough water to bring the whole to a doughy mass, which after being formed into bricks, blocks or pieces of suitable size, is dried and subjected to treatment in a cupola, or puddling or other furnace, or in any suitable converting apparatus to be converted into iron or steel. Also in dissolving in the water with which the above mass is formed, a quantity of some chlorine salt for the purpose of expelling any sulphur, phosphorus, arsenic or silicon, that may exist as impurities in the iron. Anthony L. Fleury, of Troy, N. Y., is the inventor of this improvement.

*Felly-Bending Machine.*—The object of this invention is to obtain a felly-bending machine of simple construction, which will admit, by a very simple manipulation or adjustment, of two different sized fellies being bent upon it. To this end the invention consists in the employment of a reversible former, provided with two molds of different diameters, corresponding to the two different sizes of fellies to be bent; the former being provided with a shaft having mortises made in it to receive a lever which is provided with a roller, and the shaft provided with suitable bearings. Jacob Compton, of Elmira, N. Y., is the inventor of this improvement.

*Knitting Machine.*—This invention consists in an improved system of operating two straight rows of needles in a knitting machine, whereby tubular work, such as the legs and feet of hosiery, is produced and provision is made for narrowing or reducing such work. It also consists in certain arrangements of the mechanism for operating the two rows of needles, to provide for the production of either the tubular work or single-ribbed or plain work as may be desired. Also in a certain construction of the grooved needle plates in which the needles slide, and mode of confining the said needles therein, whereby facility is afforded for throwing the needles out of and into operation, for narrowing and widening the work without taking them out of the machine. And further in certain devices interposed between the several sliding needles, of a knitting machine, for the purpose of enabling either fine or coarse yarn to be knit equally well in the same machine, and enabling the needles to be arranged closer together and a larger number to be used in the same space. Isaac W. Lamb, of Detroit, Mich., is the inventor of this improvement.

*Regulating Valve for Steam and other Engines.*—This invention consists in the construction of the openings in a regulating valve and its seat, in such manner that the valve may move in one direction from one closed position past a full opening to another closed position with less than half a revolution, the object being to provide for the shutting off of the steam in case of any accident occurring to stop the revolution of the governor. It also consists in the employment in combination with a valve having such a system of openings, of an expanding connection between the valve, and the governor to provide for the operation of the valve both for regulating the speed of the engine and for stopping it when the governor from any cause ceases to operate. And it further consists in a novel mode of combining the two disks of a double disk valve by means of screws, whereby the faces of the disks can be adjusted to the faces of their seats, and the wear of the valve and seat be compensated for. Alexander White, of Genesee, Ill., is the inventor of this improvement.

## TO OUR READERS.

**Models are required to accompany applications for Patents** under the new law, the same as formerly, except on design patents when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

**INVARIABLE RULE.**—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

**PATENT CLAIMS.**—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

**RECEIPTS.**—When money is paid at the office for subscriptions, a receipt for it will always be given ; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of our reception of their funds.

**NEW PAMPHLETS IN GERMAN.**—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,
No. 37 Park-row, New York

### ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING SEPTEMBER 15, 1863.

*Reported Officially for the Scientific American.*

*** Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

39,871.—Ladder.—Frederick Aldrich, Jr., Augusta, Mich.:

I claim the arms, B, hinged to the sides of the ladder, A, and support, C, in combination with the platform, B', and braces, D, all constructed and operating in the manner and for the purpose substantially as herein shown and described.

[This invention consists in the arrangement of a platform secured to arms which are connected by a pivot to the sides of a ladder and by a second pivot to the sides of the support in combination with adjustable braces in such a manner that the platform can be adjusted in a level position independent of the formation of the ground on which the ladder stands, and of the hight at which the same is to be placed.

39,872.—Paper-feeder.—Edwin Allen, Newark, N. J.:

I claim, first, The employment for loosening or detaching a sheet, piece or blank of paper from a pile, of a blade, H, having a toothed edge of the construction herein described with reference to Figures 3, 4 and 5.

Second, The attachment of the loosening and detaching blade, H, or any blade for a similar purpose, to a rock shaft, I, which has a reciprocating motion transverse to its axis as well as an oscillating motion upon its axis, by means of a lever, H, applied to work loosely upon the said rock shaft in combination with a spring or springs, l, and an arm, H2, and pin or projection, m, rigidly attached to the said rock-shaft, substantially as herein specified.

Third, The reciprocating and vibrating toothed or pointed finger, P, applied and operating in combination with the oscillating separator, L, and the blade, H, or other device for loosening the paper from the pile by a similar action, substantially as herein specified.

[This invention consists in the employment for loosening the blank, piece or sheet which is to be fed, from those which are below it in a pile, of a blade having an edge of peculiar form whereby it is made to take hold of the paper with greater certainty ; also in a peculiar mode of applying a blade for the above purpose, whereby it is enabled to adapt itself to the level of the top of the pile, and to any inaccuracies in its operating machinery and always to press uniformly upon the paper; also in the employment in combination with a blade or other device which loosens the top blank, sheet or piece, from the pile, by drawing or pushing its front end back in the opposite direction to the feed, of a novel device for separating the said blank, sheet or piece, from the next one below it when its front end is moved forward again after having been drawn back as above mentioned; also in a reciprocating and vibrating toothed finger operating in combination with the before mentioned devices, to convey the separate blank, piece or sheet to the mechanism, by which it is to be converted into an envelope, or otherwise manipulated or treated for any purpose.]

39,873.—Signal Whistle.—Thaddeus C. Banks, New York City. Ante-dated April 26, 1861 :

I claim the trumpet-shaped mouth-piece, b, in combination with the barrel, a, and diaphragm, d, to form a signal whistle as and for the purposes set forth.

I also claim the valve, i, applied to the said mouth-piece, b, and whistle for the purposes and as specified.

39,874.—Broom.—Wm. N. Bates, Cedar Rapids, Iowa. Ante-dated Jan. 10, 1862 :

I claim a broom made with a screw rod, B, adjustable clasp, E, central bar, G, bolts, b, cap, D, ferule, C, bolt, k, and handle, A, in the manner herein shown and described.

[The object of this invention and improvement in brooms is to so construct the parts which contain and confine the whisps of corn in the desired shape, that almost any person without tools may take an old and useless broom to pieces and substitute raw whisps o broom corn for the old, and make a strong and substantial broom.]

39,875.—Bracket brace for Stair Rails.—Elijah Betts, Boston, Mass.:

I claim a stair-rail bracket or brace provided with a swivel cap or plate, substantially as herein set forth.

39,876.—Railroad Iron Straightener and Curver.—Daniel Bolton, Springfield, Ill.:

I claim the combination of the blocks, C and D, the boss and links, I and K K, with the frame, A, constructed and operated substantially as hereinbefore described.

39,877.—Knife Sharpener and Scourer.—Alonzo T. Boon, Galesburg, Ill.:

I claim the elastic rollers, B B, combined with emery or other scouring substances, the concave wheel, C, the link, E, and the attachment of sharpening bars, K K, to frame, A A, in combination, frame, A A, cog wheel, D D, crank, H, and screw, I, as represented in the drawings and as specified.

39,878.—Door Weather Strip.—B. W. Boyce, Lansing, Mich.:

I claim the combination and arrangement of a single vibrating strip A, with a recess, a, (cut in the lower portion of a door b), by means of the staples, b b, or their equivalents, substantially in the manner and for the purpose herein set forth.

I claim also combining with the lower edge of a vibrating strip (A, Fig. 1), a strip of india rubber or other equivalent, elastically yielding substance, substantially in the manner and for the purpose herein set forth.

I claim finally, the operating tooth or lug, d, when combined with the sill, D, and vibrating strip, A, of a door, substantially in the manner and for the purpose herein described.

39,879.—Letter Box for Post-offices.—C. H. Bradley, Westchester, Pa. Ante-dated Jan. 11, 1863 :

I claim the combination with the sliding partitions, c, of the plates, e, as herein shown and described, so that the letters may be easily removed, the boxes arranged within a small space, the arrangement changed as desired, and so that the alphabetical arrangement of the boxes will be clearly visible from the exterior of the boxes, without lettering or painting on the glass ; all as herein set forth.

[This invention relates to an improved manner of arranging a series of partitions in a box, whereby said box may be divided into a greater or less number of pigeon holes or compartments as may be required, each compartment being properly lettered at all times, whether few or many are employed. The invention also relates to an improved

© 1863 SCIENTIFIC AMERICAN, INC.

manner of lettering the compartments of the box, whereby names having the same initial letter may be sub-divided and arranged so as to be readily found. The invention further relates to an improved manner of hanging the partitions whereby the same are allowed to yield or give so as to enlarge the orifices of the compartments and admit of the letters being readily abstracted when required.]

### 39,880.—Sawing Machine.—N. B. Brown, Antwerp, N. Y.:

I claim, first, The said bar, Q, provided with the rods, u u, and filled between the plates, S S, which are attached by pivots, v, to the slides, T T, on the uprights, V V, in connection with the bar or plate, O, provided with a slot, o, to receive the wrist-pin, n, of the pulley, N, and the parallel bars, r r, provided with ways or guides, s, fitted in plates, t t, or an equivalent device attached to a shaft, P, all arranged substantially as and for the purpose specified.

Second, The means employed for giving the feed movement to the log, D, to-wit: the roller, E, and carriage, C, the log being attached or dogged to the latter and resting or bearing on the roller which is rotated at the will of the operator through the medium of the levers, L K, clutch, J, pulley, H, band, G, and gearings, d e, all arranged substantially as and for the purpose specified.

Third, The sliding bar, I with pulley, Z, attached, when used in connection with the saw, R, and arranged in relation therewith, as and for the purpose specified.

[This invention relates to a new and improved cross-cut sawing machine for sawing fire-wood, &c., and it consists in a novel and improved arrangement of means for feeding the log to the saw, and in an improved means for operating and grinding the saw, whereby it is believed that several advantages are obtained over the sawing machines hitherto devised for the same work or purpose.]

### 39,881.—Copper Boiler.—A. C. Brownell, Brooklyn, N. Y.:

I claim a copper water-heater constructed in the manner substantially as herein shown and described.

I also claim as my invention the manner by which I produce or manufacture this heater, with the application of what may be called a double coupling, to-wit; the cap, E, tube, e, and socket, F, the use of which enables me to completely braze all the seams or joints of the heater and also to planish or hammer the same when brazed, thereby perfecting the heater as set forth.

### 39,882.—Portable Stove.—Isaac C. Bryant, Philadelphia, Pa. Ante-dated Aug. 2, 1862:

I claim the arrangement and combination of a double box stove, with the adjustable thumb-screws at the sides, jointed hearth plate, stove pipe plates, and jointed legs, substantially as described.

### 39,883.—Calendar Clock.—William W. Carter (assignor to B. B. Lewis), Bristol, Conn. Ante-dated Sept. 7, 1862:

I claim securing a calendar movement on to a dial plate in combination with a time or ordinary clock movement, substantially in the manner and for the purpose described.

I claim the clasp, e, for fastening the dial plates, a and b, together as set forth.

### 39,884.—Dies for Brick and Tile Machine.—Cyrus Chambers, Jr., Philadelphia, Pa.:

I claim imparting to the angles of bricks and tiles greater firmness and solidity, by forcing a larger quantity of clay into them by means of a die with tapering grooves, constructed and operating substantially in the manner described and shown.

### 39,885.—Press.—James Christison, New York City:

I claim the use in presses of the tapering windlass, M, arranged to operate in combination with the rope, W, and block, m, or their respective equivalents, so that the rope or chain, W, shall be simultaneously wound on and let off in the manner and for the purpose herein set forth.

### 39,886.—Press for Bending Metallic Plates.—John Cochrane, New York City. Ante-dated Oct. 28, 1862:

I claim, first, The combination of an adjustable cope, with a multipatyte or adjustable platen operated by hydrostatic pressure, in the manner or substantially in the manner described.

Second, The enlargement on the screws of the cope and on the rams below the platen, or of the caps or bearing points which form the platen; so that they may mutually support and sustain each other when acting upon an inclined surface, in the manner or substantially in the manner described.

Third, The combination of the guide bars, or of the columns arranged as guide bars, with the cope screws and the rams below the platen, or the caps upon the rams which form the platen, when these several parts are made to be in contact or partial contact with each other and with the guide bars or columns, for the purpose of mutual support, when acting upon inclined surfaces, in the manner or substantially in the manner described.

Fourth, The gates at either or both ends of the machine, whether arranged to open and close like a portcullis or otherwise, substantially as described.

### 39,887.—Felly Bending Machine.—Jacob Crompton, Elmira, N. Y.:

I claim the reversible former, B, having two molds, c d, of different diameters and a central roller guide, b, in connection with a removable lever, D, provided with a pressure roller, C, and a shaft, E, passing centrally through the former, B, to receive the lever, D, substantially as and for the purpose set forth.

I also claim constructing the lever, D, with a joint, f, when said lever is used in connection with the former, B, and its concomitant parts for the purpose specified.

I further claim the arrangement of the bars, F F′ and G, with the shaft, E, to admit of the latter being properly supported or retained in position and at the same time admit of the bent felly being readily removed from the mold and machine by the attachment of the bar, F or F′.

### 39,888.—Machine for Rossing Bark.—John Cowie, Portland, Maine:

I claim, first, The stationary knife, J, in combination with an adjustable toothed feed roller, E, arranged with the levers, F F, and treadle, H, to operate as and for the purpose herein set forth.

Second, The adjustable bed-plate, B C, arranged as shown, in combination with the friction rollers, M, discharge roller, G, feed roller, E, and knife, J, all arranged for joint operation as and for the purpose specified.

[This invention consists in the employment or use of a stationary knife in connection with a feed and discharge roller and bed plates, whereby it is believed that several advantages are obtained over the ordinary back-crossing machines in order.]

### 39,889.—Caster Bottle.—C. P. Crossman, West Warren, Mass.:

I claim the application of the obstruction, D c, or its equivalent to a box, A, constructed and operating in the manner and for the purpose substantially as set forth.

[This invention consists in the employment or use in a salt box of a stationary obstruction formed by a series of arms extending across the box, or by wires or any other equivalent means in such a manner, that the salt will be pulverized by coming in contact with said obstruction whenever the box is shaken and a free discharge of the same through the openings in the cover can be insured.]

### 39,890.—Coin and Letter Scale.—David Cumming, Jr., New York City. Ante-dated Feb. 2, 1863:

I claim the pivoted weight, F, and curved plate, J, operated substantially as described and for the purpose set forth.

### 39,891.—Mechanical Movements.—Robert B. Davidson, Greenville, Ky.:

I claim a combination of levers, B D E F and M, and connecting rods, G I K L and P, with a chain cord or band, O, pawl, N, and ratchet wheel, S, all as herein described.

### 39,892.—Sewing Machine.—Joseph C. Day, Jersey City, N. J. Ante-dated July 16, 1862:

I claim, first, Obtaining the required uniform vertical and adjustable horizontal movements, necessary for an adjustable feeding mechanism from a continuous reciprocating motion, by means of the reciprocating wedge face, K, dog, K′, radial arm, L, sleeve, M, and adjustable bar, N, or equivalent link, substantially as herein described.

Second, I claim the spring, I, mounted on the looper carrier, F, and arranged to operate with the needle, R, and looper, G, or their equivalents in the manner and for the purpose herein set forth.

Third, I claim the use of a guide spring, H, in combination with a looper driven independently thereof, so that the needle may be more perfectly steadied, substantially as herein specified.

Fourth, I claim so arranging the friction spring, Q, that it comes in contact with the rim of the spool, Y, after the needle has left the cloth, and releases the said spool by the return movement or descent of the needle bar for the purpose herein specified.

### 39,893.—Attaching Hooks and Eyes to Cards.—Thomas B. De Forest, Birmingham, Conn. Ante-dated July 3, 1862:

I claim the method of attaching the hooks to the card or paper, substantially as hereinbefore described; that is by passing the beak and shank astride the card and pressing the eyes of the hook into recesses, or over ledges, substantially as set forth.

### 39,894.—Snow Plow for Railroads.—Samuel L. Denney, Christiana, Pa. Ante-dated July 18, 1862:

I claim, first, The combination, use and employment of the vertical cylinders, c c, in combination with the divider, E, for the purposes and in the manner substantially herein set forth.

Second, I claim constructing the divider, E, of an equal width, corresponding to that of the cylinders, c c, at its rear end, extending it forward near to the front end of the incline plane, B, in straight lines at its base, slightly curving upward, thereby presenting a sharp oblique edge to divide the snow as it ascends the incline plane, B, substantially in the manner and for the purpose herein set forth.

### 39,895.—Steam Boiler.—Byron Densmore, Rochester, N. Y. Ante-dated July 15, 1863:

I claim the tube cylinder, A, when attached to the side of the fire-box with the tubes therein standing either perpendicularly or inclined, the fire passing up over said cylinder then down through the tubes as described.

Also the arrangement of the fire-box and grate, in combination with the tube cylinder as described.

Also the outside jacket in combination with the stops, R R, and the inside jacket, E, for the purposes set forth as described.

### 39,896.—Submarine Cable.—Patrick S. Devlan, Jersey City, N. J. Ante-dated Oct. 16, 1862:

I claim a cable formed in the manner substantially as described where the composition hereinbefore described is employed as and for the purpose set forth.

### 39,897.—Composition for Packing Projectiles.—Patrick S. Devlan, Jersey City, N. J. Ante-dated Oct. 15, 1862:

I claim the within described "composition packing," produced substantially as hereinbefore set forth.

### 39,898.—Quartz Crusher.—Julius C. Dickey, Saratoga Springs, N. Y. Ante-dated July 3, 1862:

I claim the combination of one or more of the hammers, m m, with the stamper, l, for the purposes set forth.

### 39,899.—Machinery in Pulverizing and Crushing Quartz.—Julius C. Dickey, Saratoga Springs, N. Y. Ante-dated June 29, 1862:

I claim crushing and pulverizing quartz in the revolving drum, B B, when the quartz passes into said drum through the induction end, I, and when the said drum is provided with the screen, O, or its equivalent.

### 39,900.—Screw Wrench.—Thomas H. Dodge, Washington, D. C. Ante-dated April 8, 1863:

I claim, first, Providing the rear end of the operating screw with a small gear or pinion, in combination with the use of an internal gear on the rosette, substantially as and for the purposes set forth.

Second, Confining the rosette to the ferule, substantially as described, in combination with the use of the flange, e, for the purposes stated.

### 39,901.—Car Spring.—George Douglass, Scranton, Pa.:

I claim an improved railroad car-spring formed of one or more series of straight elastic plates, when said elastic plates are compressed from opposite directions, and so confined in a rectangular frame as to leave an intermediate vibrating space between each distinct series controlling the extent of their curvature, all substantially in the manner herein set forth.

### 39,902.—Carding Engine.—Jeptha Dyson, Philadelphia, Pa. Ante-dated Feb. 21, 1863:

I claim, first, The stripper, A, constructed and clothed as described, having card teeth formed or constructed, and inserted into the fillet in the peculiar manner set forth and described.

Second, The stripper, A, with clothing prepared and applied in manner and form as described in combination with the cylinder, B, and with the main cylinder, C, and operated below the said main cylinder, C, at any convenient point between the doffer, D, and the licker in E, substantially as described, and for the purposes set forth.

Third, The stripper, A″, as described in combination with the main cylinder, C, the cylinder, B″, and the doffer, D, operated below the main cylinder, C, and doffer, D, substantially as described, and for the purposes set forth.

Fourth, The combination and arrangement of the stripper, A‴, with the features described in the third claim, and operated above the doffer, D, and the main cylinder, C, substantially as described, and for the purposes set forth.

### 39,903.—Governor for Steam Engines.—Lewis Eikenberry, Philadelphia, Pa. Ante-dated Sept. 26, 1862:

I claim, first, Arranging the arms or levers constructed as described of a governor in relation to a spring or springs in the manner and for the purposes set forth.

Second, The arrangement in a governor, of the nut, e, screw shaft, B, bevel gear wheels, C E E′, sliding rotary shaft, F, and pins or ratchets, h h′, in the manner as and for the purposes set forth.

Third, So constructing the shaft, B, that the nut, e, is allowed a chance to run out of gear with the screw thread of said shaft before a crowding and breaking of the parts of the machine occurs and so combining a spring or its equivalent with the nut and shaft, and the nut shall be kept in gearing position with the shaft, substantially as described.

### 39,904.—Gas Meter.—Joseph S. Elliott, Philadelphia, Pa.:

I claim producing the stop motions in the registers of gas meters by means of the levers, B, or their equivalents arranged to operate in combination with the recesses and teeth of the wheels, A, substantially in the manner described and set forth for the purpose specified.

### 39,905.—Manufacture of Illuminating Gas.—William Elmer, New York City:

I claim the combination of the following devices or their equivalents, viz:—

First, A retort in which water is decomposed to furnish hydrogen.

Second, A retort in which a fluid hydro-carbon is decomposed by heat.

Third, One or more furnaces for heating the retorts to the required temperature.

Fourth, Apparatus for supplying water in regulated quantities to the retort in the manner in which it is decomposed.

Fifth, Apparatus to supply a fluid hydro-carbon in regulated quantities to the retort in which it is decomposed.

Sixth, A connection to conduct the hydrogen from the place where it is formed to the hydro-carbon retort; the combination as a whole constituting an apparatus for manufacturing illuminating gas, and operating substantially as set forth.

Seventh, I also claim the combination of the hydrogen retort with the hydro-carbon retort through the intervention of a condenser, substantially as set forth.

Eighth, I also claim the combination of the boiler for generating steam with the hydrogen retort through the intervention of a heating apparatus, substantially as set forth.

Ninth, I also claim the combination of the hydrogen retort with the hydro-carbon retort, through the intervention of a heating apparatus, substantially as set forth.

### 39,906.—Brick Press.—James Finegan, Haverstraw, N. Y.:

I claim the plunger rod, D, composed of two parts, a b, one part, a, having a pin, c, passing tightly through it, which pin passes through an oblong slot, d, in the other part, b, in combination with the slide, E, fitted in the slot, e, of the part, a, of the plunger rod, and the adjustable pin, f, all arranged as and for the purpose specified.

[This invention relates to an improvement in that class of brick presses in which a reciprocating plunger is used for compacting the clay in the molds, or compressing it therein. The invention consists in forming the plunger rod of two parts connected together, and arranged in such a manner that the stroke of the plunger may be varied at pleasure and the pressure thereof consequently regulated as desired.]

### 39,907.—Dry Gas Meter.—Joseph E. Fisk, Salem, Mass. Ante-dated Feb. 13, 1863:

I claim, first, The combination of a rotary crank or eccentric and guides and stops, K K M M O, substantially as and for the purpose set forth.

Second, The arrangement of the chambered valve which is operated with an eccentric motion and controlled by a cross or its equivalent, as described in said motion, in combination with the gas ports arranged on opposite sides of the seat and around a central discharge passage in the manner and for the purposes herein described.

### 39,908.—Corset.—Lavinia H. Foy, Worcester, Mass.:

I claim, first, Forming the rim, C, by cutting out a piece from the lower part, A′, of the waist, A, as seen in Fig. 4, at a a, and inserting the semi-circle piece, C′, Fig. 5.

Second, The combination with the waist, A, and straps, E E, of detachable shoulder braces, F.

### 39,909.—Corset.—Lavinia H. Foy, Worcester, Mass.:

I claim forming the corset from the peculiar shaped pieces, Nos. 1, 2, 3, 4 and 5, substantially as shown and described.

### 39,910.—Corset Skirt-supporter.—Lavinia H. Foy, Worcester, Mass.:

I claim, first, Forming the rim, B, of a corset skirt-supporter from the bottom part of the piece, A, in combination with the use and employment of gore pieces, e f g, of different sizes, substantially as shown and described.

Second, The combination with the peculiar formed piece, A, of the gore pieces, e f g and c c, when located as shown and described and for the purposes stated.

### 39,911.—Corset Skirt-supporter.—Lavinia H. Foy, Worcester, Mass.:

I claim, first, Cutting the binding cloth bias, in combination with the mode of applying the same to the extensor or outer edge of the rim, L, whereby all gathering is avoided while a corded appearance and a case for the hoop, M, are produced, substantially as set forth.

Second, The combination of laced openings, K K, or either of them with the front part of the body, I, substantially as set forth.

Third, The body, I, open in front and adjustable both in front and in back, substantially as shown and described.

Fourth, Forming the case for the hoop and corded edges, O and P, from the same piece of bias cut cloth, as shown and described.

### 39,912.—Artificial Leg.—John Fravel, St. Louis, Mo.:

I claim, first, The within described ankle joint composed of the parts, f f′ h g, all being constructed and arranged to operate substantially as and for the purposes set forth.

Second, I claim constructing the knee joint in such manner that the side straps, k, may be made to work in mortises in the knee, and to act as stops, and so that the space, n, may be afforded for the free action and movement of the tendon, o, substantially as herein described for the purposes set forth.

### 39,913.—Machine for Printing Addresses on Newspapers, &c.—D. Fuller, Cherry Valley, Ill.:

I claim the arrangement of the shield, E, with springs, e*, and aperture, e, in combination with the reciprocating plunger, C, with projection, d, and with the galley, F, constructed and operating substantially as and for the purpose herein shown and described.

Also the reciprocating scoop, H, in combination with the plunger, C, shield, E, and galley, F, constructed and operating in the manner and for the purpose substantially as set forth.

### 39,914.—Mounting Field Ordnance.—William F. Goodwin, Powhatan, Ohio:

I claim the combination of the laterally adjustable grooved plate, D, and the trunnion and spring guides, e, with the vertically adjustable plate, C, tongue, b, axle, A, and screw, E; all constructed and operating as herein shown and described.

[This invention consists first in so arranging the piece with its trunnions in sliding bearings upon a turn-table and the turn-table upon the axle, that the movement of the gun to obtain the proper elevation is made upon the axle and not upon the trunnions, and the recoil of the gun is permitted to be directly in line or parallel with its bore. It also consists in a certain mode of combining the upper and lower plates of the turn-table, that the center pin or bolt about which the upper plate turns is relieved of strain. And it further consists in an improved mode of combining the elevating screw with the turn-table.

### 39,915.—Metallic Cartridge.—Albert Hall, Danville, Iowa:

I claim as an improved article of manufacture a metallic cartridge made with a priming tube in one piece with the shell, A, the rear portion of the shell cut and bent as shown, the front portion grooved at b, and provided with a bullet, B, grooved and attached to the shell, all in the manner herein shown and described.

[This invention relates to cartridges of that class known as fixed ammunition; and it consists in a certain novel and simple construction of such cartridges, whereby the shell is caused to be driven forward through and out of the barrel along with the bullet by the force of the explosion of the charge, but to be detached from the bullet so that it will drop to the ground soon after leaving the barrel.]

### 39,916.—Rolling Pin.—John Frederick Heissenbuttel, Brooklyn, N. Y.:

I claim as an improved article of manufacture, a rolling pin, made with flanges, b, in the manner and for the purpose herein shown and described.

[This invention relates to a rolling pin intended to be used particularly for rolling out dough for that kind of cake or biscuit known by the name of "zwieback."]

### 39,917.—Washing and Wringing Machine.—John Hewit, Carmichael, Pa.:

I claim, first, The combination of the hand bar, f, with the springs, E, slides, d, and roller, B, substantially in the manner and for the purpose set forth.

Second, I claim the removable inclined bed piece, G, in combination with the containing vessel, A, and rollers, B B′, substantially as and for the purposes set forth.

### 39,918.—Means of using Hydro Carbon Oil as Fuel.—G. B. Hill, New York City:

I claim, first, The employment or use of a mixture of hydro-carbon liquid with steam as fuel in furnaces, &c., substantially as herein specified.

Second, The mixer, a, and pipes, b b′, in combination with the vessel, a′, and radiating pipes, B, constructed and operating in the manner and for the purpose shown and described.

[This invention consists in the employment or use as fuel in steam boilers and other furnaces and in stoves and wherever it may be applied, of a mixture of steam with petroleum or other hydro-carbons in such a manner that by the blaze of this heating mixture the steam boiler, stove or other article can be heated to a very high temperature in a short time and with great economy in fuel.]

### 39,919.—Fire-proof Safe.—Eben Norton Horsford, Cambridge, Mass.:

I claim, first, A fire-proof safe consisting of two air and water-tight metallic casings or shells, A B, arranged one within the other, when constructed and combined substantially in the manner described for the purposes set forth.

Second, A fire-proof safe having apertures in its outer shell or casing for the escape of steam, when said apertures are closed with fusible alloy or cement which melts at a temperature of 212° Fah., or thereabouts, substantially in the manner and for the purposes specified.

### 39,920.—Fire-proof Safe or Chest.—Eben N. Horsford, Cambridge, Mass.:

I claim, first, Forming cavities in the filling of a fire-proof safe, substantially in the manner described, for the purposes of providing for the expansion of the water to prevent the bursting of the safe by freezing, as set forth.

Second, Covering those portions of the safe exposed to contact with the filling with a mixture of gutta-percha and paraffine varnish compounded in the proportions or thereabouts and substantially in the manner described.

© 1863 SCIENTIFIC AMERICAN, INC.

39,921.—Composition for filling Fire-proof Safes.—Eben N. Horsford, Cambridge, Mass.:

I claim as a new composition of matter for filling safes to render them fire-proof, calcined and powdered gypsum, mixed with gelatinized water, substantially in the manner and proportions described.

39,922.—Manufacture and Use of Neutral Sulphite of Lime.—Eben N. Horsford, Cambridge, Mass.:

I claim, first, Depriving sulphite of lime of its incidental and constitutional water by heat.

Second, Depriving sulphite of lime of its incidental and constitutional water, in a space from which oxygen gas is nearly or quite excluded.

Third, The use of dry, neutral, sulphite of lime, to arrest the fermentation of saccharine juices.

39,923.—Machine for making Cartridges.—Wm. H. Horstmann & Henry J. Behrens, New York City. Ante-dated March 24, 1862:

We claim, first, The combination of a mandrel, A, roller, B, or its equivalent, and guides, C, for feeding, in giving directions to and forming the paper case, substantially as and for the purposes set forth.

Second, We claim in combination with the mandrel as above specified, attaching and winding the cord around the paper case as described.

Third, We also claim the finger, G3, for inserting the end of the cord to the mandrel.

Fourth, We also claim in combination with the cartridge machine the knife, I, substantially as and for the purposes set forth.

Fifth, We also claim drawing out the cord into a loop as it is severed so as to have a projecting end to insert for the next operation as described.

Sixth, We also claim the employment of an apparatus to produce a slack and tension of the cord of a machine for making cartridge cases, substantially as herein set forth.

Seventh, We also claim a cord carrier or guide by which the cord is kept in position to wind properly upon the paper tube or case as specified.

Eighth, We claim the apparatus by which the balls are conveyed to and inserted in the paper case.

Ninth, We also claim discharging the paper case from the mandrel, substantially as herein set forth.

Tenth, We also claim the vibrating trough, K, for conveying the completed case away from the machine.

Eleventh, We also claim the vibrating pressing apparatus, B, for holding the paper and cord to the mandrel while being conveyed to the machine.

Twelfth, We claim roughening the surface of the mandrel for the purpose of feeding the paper into the machine.

39,924.—Atmospheric Trip Hammer.—Bennet Hotchkiss, New Haven, Conn. Ante-dated July 2, 1863:

I claim, first, The elastic washer, i, and bolts, N, in combination with the supporting frame, A, and working frame, B, in the manner and for the purpose substantially as herein set forth.

Second, I claim two air passages, a and b, in combination with a pneumatic or air spring cylinder when said passages are arranged substantially in the manner and for the purpose described.

Third, I claim the valves, F G, arranged as described in combination with a pneumatic or air spring cylinder, operating in the manner and for the purpose substantially as herein specified.

Fourth, I claim the combination described of the valves, F G, with the air passage, H, for the purpose of changing the air from the upper to lower air spring, or vice versa, to lessen or increase the force of the blow of the hammer without changing the velocity of the cylinder, substantially as set forth.

Fifth, I claim the enlargement of the piston-rod in the manner described, in combination with the stuffing box plates, or their equivalents, substantially for the purpose specified.

39,925.—Railroad Car Ventilator.—James L. Howard, Hartford, Conn.:

I claim the air chambers, A, produced by the extension of the raised or elevated roof of railway passenger cars, as shown in the drawings, in combination with the automatic doors, F, and air passages, B C and D, and registers, E, when constructed and operating substantially as described.

39,926.—Horse-shoe.—O. A. Howe, Fort Plain, N. Y.:

I claim a horse-shoe having india-rubber applied and secured to it in the manner substantially as herein set forth.

39,927.—Car Coupling.—Edward P. Howland, Worcester, Mass.:

I claim the construction of the drop bar, B, with a flattened portion and a pin, c, upon its lower extremity, as herein shown and described, so that said pin, c, will pass through and lock the connecting link, while the flattened portion will press upon, and by its weight maintain the link in a horizontal position; all as set forth.

I also claim the employment, in each draw head, of two separate springs, G I, of unequal tension, operating in the manner substantially as and for the purpose herein shown and described.

[This invention relates to an improved car coupling of that class which are commonly termed "self coupling," and consists in the employment of a combined weight and pin; in connection with a sliding pin-support and two springs, all arranged in such a manner that the link is enabled to secure itself in the draw-head when forced therein, and retained in a horizontal position when in one draw-head only, and the link prevented from being bent, in case of the adjoining draw-heads of two cars coming in contact.]

39,928.—Fire-place Grate.—Maurice C. Hull, New York City:

I claim, first, The end pieces, c c, of the fire pot extending back behind the grate frame, as set forth, for increasing the size of such grate or fire pot, as set forth.

Second, I claim the pipes, h, extending from the end pieces, c, to the chamber, g, for the purposes and as specified.

Third, I claim the air pipe or pipes, s t and u, passing through the chamber, g, when said pipes are so located as to cause the air that passes through them to ascend contiguous to the heated back of the grate, as set forth.

Fourth, I claim the chambers, d′, at the base of the end plates, c, for the purposes and as specified.

39,929.—Plow.—G. W. Hunt, Muscatine, Iowa:

I claim, first, Inclining the plow to suit the inclination of the land, by means and in the manner herein shown and described.

Second, The friction rollers, H I, in combination with the sliding plate, J, fixed plate, C, and rod, F, for the purpose specified.

Third, The employment or use of the two wheels, V V, at the rear or back end of the beam, D, when said wheels are used in combination and in relation with the plow, E, and driver's seat, W, as set forth.

Fourth, The arrangement of the T, branched at its lower end to receive the axle, n, of the wheels, v v, as and for the purpose set forth.

[An illustration and description of this invention appeared on page 184, current volume of the Scientific American.]

39,930.—Compound Sabot for Hot Shot.—Lemuel P. Jenks, Boston, Mass. Ante-dated Oct. 2, 1862:

I claim the interposition between the shot and sabot, or its attachments, of a non-conductor or non-conductors of heat, substantially as described.

39,931.—Seed Planter.—John M. Kelly, Clinton, Ill. Ante-dated Nov. 2, 1861:

I claim the arrangement of the pivoted frame, L L M and N, carrying the sheaves or ploughs, P, seed boxes, O, and cutter wheels Q Q, in combination with the stiff main or draught beams, A A, lever, R, and standard, J; for the purpose of regulating the depth of furrow, substantially as and for the purpose set forth.

39,932.—Journal Box.—James P. Kenyon, Brooklyn, N.Y. Ante-dated Feb. 2, 1863:

I claim the employment of the rings, E E E E and D′ D′ D D, to confine and support the rollers, C C C C C C, in position as shown, or any other device substantially the same.

39,933.—Bedstead and Table combined.—Oliver Lafreniere, New York City. Ante-dated Dec. 12, 1862:

I claim the combination of the disk or plate, A, legs, D, and sacking bottom or mattress, F, constructed and arranged to form a new and useful article of manufacture, for the purpose specified.

[The object of this invention is to combine a bedstead and table in such a way as to form a portable and convenient device, well calculated for camp use, and also for ordinary purposes, where it is necessary to economize in room or space.]

39,934.—Knitting Machine.—Isaac W. Lamb, Detroit, Mich.:

I claim, first, The employment in a knitting machine of two straight rows of needles operating alternately in such a manner that the yarn conductor passing down and back will carry the yarn over one row of needles while passing in one direction, and over the other row while passing in the opposite direction, substantially as herein described, thereby uniting the work produced by the two rows of needles, at each end of the rows, and making tubular knitting in a straight knitting machine.

Second, The employment, for giving motion to the two straight alternately operating rows of needles to produce tubular knitting, of two cams, F G and F′ G′, a portion of which is shifted at every stroke of the machine to produce the alternation in the operation of the two rows of needles, substantially as herein specified.

Third, Combining the movable portions of the cams with the sliding frame or carriage which carries them by means of slides, H, longitudinally moving parallel bars, J J′, oblique slots, q q, and pins, p p, the whole operating substantially as herein set forth.

Fourth, Combining the longitudinal parallel bars, J J′, with the sliding frame or carriage which carries the cams by means of a screw, L, secured to the transverse connection, K, of the said bars, and finished with a head, L*, and adjustable stop nuts, M M′, operating substantially as and for the purpose herein specified.

Fifth, Providing for the permanent attachment of the parallel bars, J J′, to the sliding frame or carriage, either in position to fix both needle cams in an operative position, to operate both rows of needles for the production of ribbed work, or in a position to secure one cam in an operative condition, and the other in an inoperative condition, for the knitting on but one row of needles, as in knitting the heels of stockings.

Sixth, In combination with the needle plates having their several needle grooves open from the inner to the outer edges of the needle plates, I claim the rods, s s, inserted through grooves, v v, in the needle plates, intersecting the needle grooves, substantially as set forth, for the purpose of preventing the needles from slipping out.

Seventh, The yielding jacks, t t, applied in combination with the needle plates, and needles, substantially as and for the purpose herein specified.

39,935.—Stud.—Thomas S. Lambert, Peekskill, N. Y.—Ante-dated Oct. 11, 1862:

I claim a stud constructed by fastening together or nearly together two buttons or similar devices, by a thread, cord, braid or other elastic material, substantially as set forth.

39,936.—Propelling Steering Apparatus.—Robert H. Lecky, McClure, Pa.:

I claim the combination and arrangement of the propeller, b, shafts, c and d, packing box, i, wheels, g h and j, head block, n, tiller ropes, m and o, and tiller wheel, P, the whole being combined and arranged substantially as herein described and for the purpose set forth.

39,937.—Ventilator for Buildings.—Joseph Leeds, Philadelphia, Pa. Ante-dated Dec. 14, 1862:

I claim operating the valve plate, B, of the ventilator, by means of its gravitating tendency, in combination with the one cord, C, and a weight, E, attached to the lower end of the said cord, substantially in the manner described.

39,938.—Skate.—James Lyon, Mott Haven, N. Y.:

I claim the dovetail recesses in the blocks, d and e, open from end to end, in combination with the tapering dovetail blocks, b and c, on the skate, a, as and for the purposes specified.

39,939.—Coal Stove.—George H. Magersuppe, New York City:

I claim, in a stove for burning dust and refuse coal, the moveable bottom, n, with its pins, o o o o, grate, e, handle, E, in combination with the inner cylinder, B, when constructed and operating substantially as described.

39,940.—Projectile for many-chambered Gun.—William McCord, Sing Sing, N. Y. Ante-dated, Nov. 1, 1862:

I claim the before-described projectile formed of a steel or other hard metal chisel-shaped front, as described, with pistons, B, attached to the rear of the same, for insertion into the corresponding bores of a many-chambered gun, as herein set forth.

39,941.—Sight for Fire-arms.—William McKibbin, Buck Valley, Pa.:

I claim the right-angle sight herein described.

[This invention consists in what may be termed a right-angle sight, that is, a sight the edge of which is in the form of a right-angle, and which possesses important advantages over the ordinary notched sight commonly used as the back sight of fire-arms.]

39,942.—Rifled Projectile.—John McMurtry, Lexington, Ky. Ante-dated Oct. 16, 1862:

I claim the making, on the sides of an elongated projectile, two or more grooves or channels, with an increasing spiral twist toward the rear end of the projectile, substantially as described, and for the purposes set forth.

I also claim the above-named improvements in projectiles, in combination with the "Minié" feature, substantially as described and for the purposes set forth.

I also claim the above-mentioned improvements in projectiles; in combination with the omission of that portion of the channels, B B, from the front of the projectile, to that part of same where the twist of the channel commences, substantially as described and for the purposes set forth.

39,943.—Plow.—Solomon Mead, New Haven, Conn.:

I claim the construction of the moldboard, or turning surface of plows, to correspond with a section or segment of a cone, substantially as before described and for the purposes set forth.

39,944.—Incorrodible Mark or Label for Bales of Cotton, &c.—Henry D. Mears, Washington, D. C.:

I claim the combination with a label or tag or identifying mark for bales of cotton, wool, hemp, flax, hay or other fibrous material, of an attachment of metal rendered incorrodible or of metal or material of itself incorrodible, in the manner and for the form herein set forth.

I also claim the combination of the hook or needle, the metallic cord or cable, the tag and seal; the whole constructed and operating substantially as herein set forth.

39,945.—Bracket for Lamp or Gas Light.—Charles Monson, New Haven, Conn. Ante-dated July 4, 1862:

I claim the use of the parallel tubes, as A and B, in combination with Z-shaped tubes, as C Fig. 2, or tubes of any analogous form, so as to use insertion conduit joints, when the whole is constructed, arranged and fitted for use substantially as herein described.

Second, I claim the use of the rack, a, and ratchet or click, b, for sustaining the light at the desired elevation, in combination with the parallelogram, substantially as set forth.

39,946.—Apparatus for Rubbing Type.—William Moore, Brooklyn, N. Y. Ante-dated Oct. 18, 1862:

I claim the employment of cutting plates formed with wedge-shaped mouths, substantially as specified and for the purposes set forth.

I also claim the employment of plates with openings between them to press the type to the cutters and avoid heating, as set forth.

39,947.—Submarine Battery.—Nelson W. Northup, Greene, N. Y. Ante-dated Aug. 14, 1862:

I claim the combination of the buoys, magazines, levers, spring hammers, nipple tubes, cords or wires, and cables, with the anchor weights, made, arranged and operated as hereinbefore described, and for the purpose therein named.

39,948.—Apparatus for Evaporating.—M. Pake, Dorchester, Ill.:

I claim the within-described arrangement of the pans, (C and C′) in combination with the furnace, A A′ A″ r s, all being constructed and arranged substantially as and for the purposes set forth.

39,949.—Self-holding Clamp for Curtain Fixtures.—F. C. Payne, New York City. Ante-dated Jan. 18, 1863:

I claim the shell or case, A, having an open front and an interior surface, a, composed of a groove, b, and raised surface, c, and also provided with a recess, e, at one side, in combination with the conical pulley, B, placed in the shell or case, and arranged relatively in respect to its diameter or larger and smaller ends, with the groove, b, and raised surface, c, to operate as and for the purpose herein set forth.

[This invention consists in placing a conical pulley within a shell or case having an open side or front, and a back surface provided with a groove or recess sufficiently deep to allow the cord to work freely around the smaller part or diameter of the pulley, and a raised surface or bed behind the larger part or diameter of the pulley, which bed will not allow the cord to work around the pulley; the case being also provided at the side which adjoins the larger end of the pulley with a notch or recess to admit of the cord being thrown or adjusted with facility over the large part or diameter of the pulley, in order that the latter may, when desired, serve as a clamp to hold the cord and the article that may be suspended to it, or which may be attached to the pulley.]

39,950.—Packing Bottles, &c., for Transportation.—T. Morris Perot, Philadelphia, Pa. Ante-dated June 16, 1863:

I claim the system of cases or packages, C C, having belts or projections so arranged that, while the said packages fit snugly together within a box or drawer, A, the main body of one package shall be free from contact with that of the adjacent package, as set forth for the purpose specified.

39,951.—Wagon for Transporting Medicine. T. Morris Perot, Philadelphia, Pa.:

I claim the arrangement within the body of the wagon substantially as descried, of the cases, D E F G and H, the intervening space, I, and doorway, J, for the purpose specified.

39,952.—Medicine Case.—T. Morris Perot, Philadelphia, Pa.:

I claim, firstly, The within-described case, with its partitioned front, C, partitioned drawers, D, lid, G, chamber, A, and drawer or drawers, E, the whole being constructed and arranged substantially as and for the purpose herein set forth.

Secondly, The within described recess for the bottles, each recess having at the bottom a spring, d, for elevating the bottle, a notch or cavity at the top for the reception of the stopper, and a guard, i, in front, and the whole being arranged substantially as and for the purpose herein set forth.

39,953.—Graining Tool.—William J. Potter and William H. Arnold, Chicago, Ill.:

We claim, first, Constructing a roller for graining and other ornamental painting with the two jaws, L & R, substantially as and for the purposes herein shown and described.

Second, We claim the combination and arrangement of the circular plate, C, the rods, d, provided with the pin, i, the spring, s, and the slots, a and c, constructed and operating substantially as and for the purposes herein shown and specified.

Third, We claim arranging said rollers in sets, and the ornamental design thereon, in such a manner that one complete and perfect design may be grained or imitated by the employment of said rollers in set, in the manner herein specified and described.

39,954.—Camp and Hospital Cot.—George M. Powell, River Falls, Wis., Charles D. Lincoln, Biddeford, Maine, and G. Evans, Richburg, N. Y. Ante-dated April 11, 1863:

We claim, first, The combination of the webbing, A B, rollers, C, stays, E, and legs, H J, constructed and employed substantially as and for the purpose set forth.

Second, The grommet, F, formed upon the ends of the stays, E, passed through the rollers, C, all as hereinbefore explained.

Third, The locking device, N, employed in connection with the hinged legs, H I or J, in manner substantially as and for the purposes set forth.

[This invention possesses great value, from its cheapness and simplicity of construction, its strength, durability and convience in use, the facility with which it may be set up and taken down, and its lightness and compactness for transportation.]

39,955.—Slide Valve for Steam Engines.—William B. Robinson, Detroit, Mich.:

I claim the packing, f g, composed of two or more divided or segmental rings, or their equivalents, fitted one within the other and arranged and fitted within a cavity, e e, in the back of the valve, to which steam is admitted through openings, j j, in such manner as to compress or contract the packing around the inner face of the said cavity and at the same time press it against the cover or back of the steam chest, all substantially as herein specified.

[This invention relates to the protection of the back of the valve from the pressure of the steam in the steam chest, by means of a packing which is fitted to the valve and works in contact with the inner face of the cover of the chest. It consists in a novel construction and arrangement of the packing whereby the pressure of the steam is made to keep it steam-tight and compensate for wear.]

39,956.—Belt Shipper.—Toppan P. Rodgers, Taunton, Mass.:

I claim the boxes, G, one or more, connected to or cast with sliding plates, E, fitted between suitable guides arranged on plates, E, or otherwise, in such a manner as to admit of the boxes, G, as the belt is shifted, working over the belt openings, a, in the floor, substantially as and for the purpose herein specified.

[The object of this invention is to obtain a belt shipper which will protect a belt passing through a floor, that is to say, prevent chips, waste and any substances that may be upon the floor passing through the openings in the floor through which the belt passes, and at the same time admit of the floor being provided with water if necessary without having the water pass down through the belt holes.]

39,957.—Steam Engine.—John B. Root, New York City:

I claim, first, The two pistons, D and E, combined with each other and with the cylinder, A, and crank shaft, G, to operate substantially as herein specified.

Second, The packing plate, Q, applied in combination with the cylinder head, C, and the two pistons, D E, substantially as and for the purpose herein set forth.

Third, The wedge frame, R, and its double series of wedges, y y, applied in combination with the cylinder head, c, and packing plate, Q, to operate substantially as and for the purpose herein described.

Fourth, The eccentrically-moving disk or ring-valve, I, constructed with an annular cavity, i, and operating substantially as herein described.

Fifth, Combining the valve operating eccentric, J, with the crank shaft, G, by means of the arm, L, and the toothed gearing, p q r, or its equivalent, substantially as and for the purpose herein set forth.

Sixth, Providing for the lubrication of the crank-wrist bearing by means of channels or passages made in the wrist and wrist plate or arm of the crank, and communicating with the journal box or bearing provided for the shaft in one of the cylinder heads, substantially as herein described.

Seventh, And finally, I claim an engine composed of a cylinder, A, two pistons, D E, working one within and at right angles to the other in the said cylinder, a shaft, G, furnished with a crank connecting directly with the inner piston, E, and a valve, I, and system of ports, e e′ f f′, for effecting the induction and eduction of the steam or other liquid to and from the cylinder and the interior of the outer piston, the whole operating substantially as herein described.

39,958.—Hold-back for Carriages.—Reuben Rolph, Coventry, N. Y. Ante-dated Nov. 2, 1861:

I claim the combination of the india-rubber tube, F, bridge, b, and hook, A, arranged substantially as and for the purpose set forth.

[The object of this invention is to obtain a hold-back for the thills of vehicles that will admit of the breeches or hold-back straps detaching themselves or slipping out from the hold-back, as the animal moves out from between the thills. The invention is more especially designed to be used with whiffletrees, which are provided with means for detaching both traces simultaneously to liberate the horse from the whiffletree; a device which will be greatly augmented in value by this invention, as the latter, in connection with the former, admits of the horse being completely and instantly detached from the vehicle.]

39,959.—Machine for Measuring Grain, &c.—Charles Ross, Hartland, Mich.:

I claim the combination with the frame, A, discharge opening, C,

© 1863 SCIENTIFIC AMERICAN, INC.

and grain valve or slide, B, of a grain bin of the arm, D, inclined block, E, actuating pawl, J, and index box, F, containing the indicating mechanism, in the manner and for the purpose herein shown and described.

[This invention consists in connecting, in a novel way, the slide which covers the discharged opening of a bin or grain receptacle, with a ratchet wheel having an index attached to it which works over a dial, all the parts being arranged in such a manner that by operating the slide, so as to open and close the discharge aperture, the ratchet wheel will be turned, and the number of measures drawn from the bin indicated by the index on the dial.]

### 39,960.—Rolling Mill.—T. F. Rumbold, St. Louis, Mo. Ante-dated June 2, 1863 :

I claim the forming of the mold or working surface around the rollers in a spiral or screw-like form, making one continuous track from one end of the rollers to the other end of the same, so as to be the counterpart of the bar or beam that is desired to be rolled, substantially as set forth.

### 39,961.—Gang Plow.—J. L. Runk, Nashville, Ill. :

I claim, first, The employment of the inclined bolster, D, in combination with the screw, f, platform, E, and beams, H, all being constructed and arranged to operate substantially as herein described for the purposes set forth.

### 39,962.—Machinery for breaking and cleaning Flax, Hemp, &c.—Gelston Sanford and J. E. Mallory, New York City :

We claim imparting to one or more pairs of rollers for breaking and cleaning flax, or other fiber-yielding plants, a rotary reciprocating motion, with the range of motion greater in one direction than in the opposite direction, by combining with the said rollers a screw or worm having a rotary and a longitudinal reciprocating motion, substantially as herein described.

### 39,963.—Device for quartering, coring and stringing Fruit. S. T. Sanford, Fall River, Mass. :

I claim the coring device, G, quartering cutters, H, and stringing cutters, I, arranged as shown, in combination with the sliding rod, C, provided with the point or spur, E, and curved arms, D, the above parts being connected or applied to a suitable upright or support, A, and upright or support, A, and all arranged substantially as herein set forth.

### 39,964.—Corset.—Mina Sibille, New York City :

I claim the hip pieces, d d, quilted and introduced in the lower portions of the sides of the corset below and between the parts, a and b, in the manner and for the purposes specified.

I also claim the quilted bosom gores, c c, introduced in the front piece, a, of the corset, with the tongue, 7, between them, as set forth.

### 39,965.—Condenser for Steam Engines.—Alba F. Smith, Norwich, Conn. :

I claim, first, in condensing or partially condensing steam engines, the arrangement of the condenser and passages, 7 and 8, connecting the same with the tanks, W W′, and of the passage, 9, connecting the tanks, W W′, substantially as and for the purpose herein set forth.

Second, I also claim, in such engines the passing of the air for combustion or for promoting the draught through the water or equivalent receptacle for storing the caloric, and thus aiding the efficiency of the apparatus, substantially in the manner herein set forth.

Third, I also claim, in such engines, when a quantity of water or other fluid is used as a receptacle for so storing caloric, bringing the water, after its use, to condense the steam in direct contact with the air employed to receive the heat, substantially in the manner and for the purpose herein set forth.

Fourth, I also claim, in such engines, so introducing such air that the motion thereof toward the surface of the water, which is due to the difference in density between the air and the water, shall induce or promote a circulation of such water, substantially in the manner and for the purpose herein set forth.

### 39,966.—Sewing-work Holder.—A. M. Smith, New York City. Ante-dated Nov. 1, 1862 :

I claim, first, the holder, as described, constructed in two sections, so arranged and hinged together that it can be attached to the lap by closing them together on the garment covering it, as described.

Second, I claim, in combination with the foregoing, the spring, h, in connection with the attachments, f f and g g, to the sections, substantially as and for the purpose herein described.

### 39,967.—Cooling-room for Preserving Provisions.—D. E. Somes, Biddeford, Maine. Ante-dated July 20, 1862 :

I claim the combination of the insulated chamber, A, vertical tube or tubes, E, one or more vats, E′, and ventilating pipe, F, all constructed, arranged and operating in the manner and for the purposes herein shown and explained.

[This invention consists in the arrangement of a room surrounded by four air passages separated from each other by suitable partitions, and which are supplied with fresh air by one or more air ducts in combination with a pipe carrying fresh air down to the bottom of the room, and with another tube leading from the upper part of the room into the open air, in such a manner that, by means of the two last named tubes, a circulation of fresh air is effected in the interior of the room, while, at the same time, by means of the air duct, a continuous circulation of fresh air is kept up through the several air passages surrounding the room, and that meat or other articles placed in the room can be kept cool and fresh for a long time.]

### 39,968.—Varnish for making Printers' Ink and for other Purposes. David Steinert, Hamburg, Germany :

I claim, first, the within described production of thick varnish, the same consisting of refined petroleum and resin or resinous gums, the latter in very large proportion, with or without the addition of soap, the ingredients being agitated together at the temperatures designated, as and for the purpose herein set forth.

Second, The within-described production of thin varnish, the same consisting, first, of refined petroleum and resin or resinous gums, the latter in very large proportion, with or without the addition of soap, and ultimately of a much larger proportion of petroleum, the ingredients being agitated at the temperatures designated, while the proportion of petroleum is small, then cooled and subsequently again agitated at the moderate temperature designated, as and for the purpose herein set forth.

Third, The use of soap in combination with petroleum and resin or resinous gums, as and for the purpose herein set forth.

### 39,969.—Grate.—Salmon Stevens and J. P. Smith, Pittsburgh, Pa. Ante-dated Nov. 24, 1862 :

We claim, first, In combination with the grate, B, thus arranged, the perforated guard plate, C, applied to the grate, as and for the purpose set forth.

Second, The drum or cylinder, E, communicating with air ducts, i i j, provided with a slot or opening, l, at its upper part, and arranged relatively with the flue or chimney, F, grate, B, and damper, G, to operate as and for the purpose specified.

[This invention consists in having the grate made with four sides and a bottom, or what may be termed a basket form, so that it may hold its contents independently of the stove or fire-place, and having the grate fitted in the stove or fire-place, so that it may be adjusted further in or out to radiate more or less heat into the apartment, as may be required. The invention also consists in using a perforated guard plate at the back end of the grate, to prevent the escape of coal at said part of the grate. The invention further consists in the employment of an air duct or passage, in combination with a damper, for the purpose of controlling the draught of the chimney and the radiation of its heat as may be desired.]

### 39,970.—Fruit Ladder.—Joseph Stiles, Salem, Mich. :

I claim the strip, h, attached to the cleats, f g, at the under side of the platform, C, and operating in combination with the rounds, b c, of the ladder and support, in the manner and for the purpose shown and described.

[This invention consists in the application to an ordinary step-ladder of a platform which adjusts itself in a horizontal position whenever the ladder is opened, and which forms a convenient place to stand upon in picking fruit from trees, and affords sufficient room besides to place the basket upon.]

### 39,971.—Carriage Seat.—Gottfried Teichert, New Haven, Conn. Ante-dated Nov. 26, 1862 :

I claim, first, The arrangement of the curved levers, F, with slots, i, and hinged reversible seat, C, with curved arms, b, in combination with the arms, g, and foot board, E, all constructed and operating as and for the purpose shown and described.

Second, The combination of the hinged reversible seat, C, and foot board, E, with the dash board, B, of a carriage, substantially as and for the purpose set forth.

[The object of this invention is to provide a carriage with a reversible seat and foot board, which, when not used, can be turned out of the way, and which can be conveniently changed or reversed, when it is desired to use the same.]

### 39,972.—Preparing Dough for Biscuit, &c.—J. R. Treadwell, Brooklyn, N. Y. Ante-dated Sept. 2, 1863 :

I claim the application of pressure to a mass of loosely-mixed or "cast" dough by means of molds, and a suitable press, substantially as described, whereby the mass is compressed into a solid slab of dough, having a comparatively smooth surface or skin, of convenient shape for the succeeding operation of the brake rolls, substantially as set forth.

### 39,973.—Fence Post.—George Vanauken, Phelps, N. Y. :

I claim supporting a fence by bolting the posts, A, to which the horizontal rails or boards, C, are attached, to the vertical faces and near the upper ends of flat stones, B, set edgewise in or upon the ground, all as herein particularly described and for the purposes specified.

[The object of this invention is to prevent the decay of fence posts and to restore and render useful posts which have become worthless as commonly applied.]

### 39,974.—Pump.—W. W. Virdin, Baltimore, Md. :

I claim, first, The intermediate moving valved chamber, B, constructed, arranged and operating substantially as described, in combination with the stationary valved chamber, E, and the valved receiving, outer, stationary chamber, A, all adapted to the end stated, and substantially as specified.

Second, The outer stationary valved cylinder, A, stationary inner mast, discharging cylinder, E, in combination with the intermediate-valved cylinder, B, and connecting arms, C C, the latter passing directly through the central plate, G, and cap plate, D, the whole constructed and operating substantially as described.

Third, The manner of securing the three-valved cylinders, A and E, together at their upper ends, viz., by means of the flanges, a f, and plate, G, substantially as described.

### 39,975.—Rotary Spading Machine.—W. Wadsworth, Sacramento, Cal. :

I claim the employment of the cleaner or cam, G, in combination with the spades, d, substantially in the manner and for the purpose herein shown and described.

[This invention consists in attaching a series of spaces to shafts which are fitted between two wheels at equal distances apart, so as to form a skeleton drum, the spade shafts being allowed to turn in the wheels, and operated through the medium of cams, so that the spades will assume a proper position when entering and leaving the earth to insure the proposed pulverization of the same.]

### 39,976.—Soda-water Fountain.—M. W. Warne, St. Louis, Mo. :

I claim the arrangement of the air chamber, F, within the soda tank, B, and in combination with the suction and force pump and the draft pipe, the whole arranged relatively to the stand, C, substantially as and for the purpose herein described.

[This fountain is of that kind from which a solution of supercarbonate of soda and a mixture of syrup and acid are drawn separately into the glasses. The invention consists in a novel arrangement of an air chamber in combination with the tank which contains the soda solution, and with a suction and force pump and elevated draft tube, whereby a quantity of the solution is retained in the vessel under sufficient pressure to force it through the draft tube, and is kept cool for delivery to the said tube.]

### 39,977.—Projectile for Fire-arms.—Chas. A. Waterbury, New York City. Ante-dated Nov. 8, 1862 :

I claim the method of giving the revolving motion to the projectile, that is to say, by forming a conical projection and spindle upon the base of the shot, and combining therewith a movable ring or disk of an expansible material, in the manner and for the purpose described herein.

### 39,978.—Apparatus for condensing Oil Vapor.—J. W. Wetmore, Erie, Pa. :

I claim, first, The separate upward-flowing currents above and below the vapor chamber.

Second, The propulsion of these currents on the principle of the siphon.

Third, The corrugation of the upper condensing surface,

Fourth, The breaks of wooden angles or doors in the vapor chamber.

Fifth, The sprinkler, v, figure 4, all substantially as set forth for the purposes specified.

### 39,979.—Governor Valve for Steam Engines.—Alexander White, Geneseo, Ill. :

I claim, first, The employment, in combination with a valve having such a system of openings, as hereinbefore described, of an extensible connection consisting of a link, F, or its equivalent, operating substantially as and for the purpose herein set forth.

Second, Combining the two disks of a double-disk valve by means of posts, j j, constructed with right and left-hand screw threads, and applied to operate substantially as herein described.

### 39,980.—Machine for Measuring Grain.—Thomas Wilson, Metamora, Ill. :

I claim, first, The cylinder, C, provided with two grain receptacles, a a, in connection with the hopper, E, provided with the slide, F, operated through the medium of the roller, G, and projections, i i, substantially as and for the purpose herein set forth.

Second, The scale beam, H, connected with the hinged plate, I, in combination with the pins, j j, on the cylinder, C, arranged to operate as and for the purpose set forth.

Third, The screw rod, D, passing through the cylinder shaft, B, and provided with the weights, b b, for the purpose of balancing the cylinder, C, on the shaft, B, as specified.

Fourth, The two indexes, M Q, operating by gearing from the shaft, B, substantially as shown, when said indexes and dials are used in combination with the cylinder, C, and scale beam, H, and all arranged for joint operation, as and for the purpose set forth.

Fifth, The brake formed of the cam, n, or shaft, B, the elastic rod, R, rod, S, curved or bent, as shown, and the projections, s s, on the cylinder, C, in combination with the lever or catch, T, all arranged to operate as set forth.

[The object of this invention is to obtain a simple and efficient device which may be applied to or used in connection with a thrashing machine, and which will measure with accuracy and indicate the number of bushels of grain that have passed through or have been thrashed out by the thrashing machine.]

### 39,981.—Separating Vegetable Fibers.—W. E. Woodbridge, Little Falls, N. Y. Ante-dated June 24, 1863 :

I claim, first, The application of the quantity of alkali requisite for separating the fibers of the material acted on in such condition or strength of solution that it may be wholly absorbed within the pores of that material, and subjecting the material so impregnated to a desiccative heat, thereby concentrating the absorbed solution and promoting the action designed, the quantity of alkali and the precise temperature to be regulated by the nature and quality of the materials employed, as set forth in this specification.

Second, I claim the method of impregnating the material by inclosing it in a revolving vessel to which the solution is gradually supplied, substantially as described.

Third, I claim the subjection of the material thus impregnated to desiccative heat in the same vessel in which the impregnation is effected.

Fourth, I claim, in connection with the process described, the recovery of the alkali contained in the soluble portions of the prepared material, for renewed use, by removing them with as small a quantity of water as is usefully practicable, and by evaporation and incineration.

### 39,982.—Corn Planter.—H. M. Wyeth, Bloomfield, Iowa :

I claim the combination of the seed droppers, E, with the levers, F and L, and cams, H and I, by which a vertical reciprocating motion is imparted to the seed droppers while the seed slide, M, is operated horizontally, substantially in the manner herein described.

I also claim, in combination with the seed droppers, substantially as herein described, the lever, N, for throwing the machine out of gear, substantially in the manner herein set forth.

### 39,983.—Weather-strip for Doors.—John Youngberg, of Galva, Ill. Ante-dated Dec. 8, 1861 :

I claim the construction of a weather-strip as described, of india-rubber stiffened by a plate, in such a manner that it will be opened by the opening of the door, and closed by its own elasticity when the door is closed.

### 39,984.—Marine Propelling Apparatus.—Walter Aitken (assignor to himself and H. R. Fowler), Newark, Ill. Ante-dated Sept. 12, 1863 :

I claim the combination and arrangement of the arms, B, the wheels, C, the reciprocating bars, D, the band, d, and the folding floats, a a, with the peculiar-shaped levers, E, and the rods, n, all being constructed, arranged and operating substantially as and for the purposes herein described and delineated.

Second, I claim the peculiar form and construction of the rod, m n, in figure 3, when used in combination with the bar, D, and the buckle, a′, for the purposes herein specified and set forth.

Third, I claim the combination of the arms, B, and the wheels, C, the reciprocating bars, D, the bands, d, and the hanging bucket, a′, with the peculiarly formed and constructed rod, m n, shown in figure 3, when all are arranged, constructed and operating substantially as and for the purposes herein delineated and set forth.

### 39,985.—Device for driving Nails, &c., in Picture and other Frames.—Willard Bascom, New York City, assignor to Robert Foulds, Brooklyn, N. Y. :

I claim, first, The piercing awl or awls, fitted as specified, in combination with the hammer or hammers that cover the awls and press in the nails, as set forth.

Second, I claim the sliding head actuated by a treadle, in combination with the awls and hammers, actuated as specified, whereby the attendant is at liberty to use his hands in the introduction of the nails and the steadying of the frame, as set forth.

Third, I claim the construction of the holder, q, to receive the pieces of material forming the frame, and fitted with the springs, 3, to retain said pieces in place as specified.

Fourth, I claim the ejecting pins, v, in combination with the frame, r, and holder, q, for the purposes set forth.

### 39,986.—Composition for blacking and polishing Leather. Amos Bond (assignor to himself and L. B. Loux), Philadelphia, Pa. :

I claim a composition of asphaltum, or its equivalent, beeswax and benzine, or other equivalent solvent, prepared substantially in the manner and for the purpose described.

### 39,987.—Tobacco Pipe.—Hezekiah Bradford (assignor to Horatio Bogert), New York City. Ante-dated May 5, 1863 :

I claim, first, The spur or projection, b, to hook behind the teeth in the lower jaw and suspend the pipe, in the manner and for the purposes specified.

Second, I claim the pipe, d, formed with the bulb, c, and entering said bulb at the bottom, in combination with the mouth piece or pipe, a, passing away from the upper part of said bulb in the manner and for the purposes specified.

Third, I claim the pipe, d, returned or bent around from the bottom of the bulb, c, to the mouth-piece or tube, a, or nearly so, as specified, and for the purposes set forth.

Fourth, I claim the reaction bulb or chamber, f, in the pipe, d, for the purposes specified.

Fifth, I claim the cylinder or cap, n, surrounding the bowl, e, for the purpose of directing the air against the heated bowl in its passage into the pipe for the purposes specified.

### 39,988.—Machine for Cutting Screws.—J. R. Brown, Boston, Mass., assignor to Brown & Ashcroft. Ante-dated Feb. 29, 1861 :

I claim a screw-cutting machine, having its parts constructed and operating to cut a screw upon a pipe or cylinder, substantially as set forth.

I also claim the combination and arrangement of the screw guide, D, the tubular cutter carrier, B, provided with dies, a a a a, and the ratchet and pawl, K F, constructed and made to operate as set forth.

I also claim the peculiar construction of the said ratchet and pawl, and their application to the cutter carrier, B, and the lever, I, the same being substantially in manner and for the purpose as specified,

### 39,989.—Hay Rake.—Charles P. Carpenter (assignor to himself and Eben L. Clement), St. Johnsbury, Vt. Ante-dated Dec. 17, 1862 :

I claim the arrangement in combination with the longitudinal beam, A, of the shoe, D, roller, S, diagonal and adjustable head, B, on one or both sides of the beam, A, and the tumbling rake, E, substantially in the manner and for the purposes as set forth.

### 39,990.—Clothes Washer and Wringer.—John Cram (assignor to himself and John S. Cram), Boston, Mass.:

I claim as the combination of the two washing rollers, D E, when constructed substantially in manner and so as to operate as specified.

Also the combination and arrangement of the squeezing roller, C, and the two washing rollers, D E, the whole being constructed and arranged with respect to the tub, A, substantially in manner and provided with pressure springs and levers, or mechanical equivalents therefor as specified.

Also the combination of the movable soap or detergent holder, H, and its spring, I, with the two washing rollers, D E, and the tub, A, arranged as explained.

### 39,991.—Manufacture of Iron.—Anthony L. Fleury (assignor to William E. Hagan), Troy N. Y.:

I claim the use of the clorine salts with the lime and cinder in the manner and for the purpose substantially as herein shown and described.

### 39,992.—Machinery for Grinding the Edge of File Blanks.—H. E. Grandy, Ballardvale, Mass., and Sargeant O. Morse, Bedford, Mass., assignors to the Whipple File Manufacturing Company, of Ballardvale aforesaid :

We claim the feed-rolls, G and H, and the pressure roll, l, operated by the lever, K, and arm, L, or their substantial equivalents in combination with the grind-stone, C, constructed, arranged and operating substantially as set forth.

### 39,993.—Sash-stop or Fastener.—Stephen Hedges (assignor to himself, Samuel M. Longley, and Samuel B. Smith), of Hudson, N. Y. :

I claim a window-sash stop or fastener, composed of a tube, C, slotted in the side as at C, and provided with a spring bolt, D, a side elbow or arm, E, working through said slot, and a strip, F; all made and operating as herein shown and described.

This invention relates to that class of window-sash stops or fastenings in which a spring bolt is fitted within a tube or case. The object of the invention is to obtain a simple mode of constructing the class of stop or fastening above specified, and render the same capable of being more readily applied than hitherto; more economical to construct, capable of being operated with greater facility, and also more substantial.

### 39,994.—Metal Box.—Henry Howson, assignor to William F. Warburton, Philadelphia, Pa. Antedated March 12, 1863:

I claim the stationary receptacle, A, its inclined or projecting front, a, and opening, b, the whole being formed substantially as set forth in combination with the lid or cover, B, the latter being hung to the receptacle through the medium of the arms, h h, at such points that the said lid may be self-closing as described for the purpose specified

### 39,995.—Folding and Reclining Chair.—George Hunzingen, Brooklyn, N. Y., assignor to C. Henry Glinsman New York City. Ante-dated Dec. 14, 1862 :

I claim first, The arms, f, in combination with the bars, g, attached at the center of the folding X legs as and for the purposes specified.

© 1863 SCIENTIFIC AMERICAN, INC.

Second, I claim the notched bar, d, connected to the lower end of the back, c, in combination with the foot-rest, e, and pins or screws, (three or four) as and for the purposes specified.

Fourth. I claim the sliding board or frame, 14, in the foot-rest, e, when combined with the folding and reclining chair aforesaid in the manner and for the purposes aforesaid.

### 39,996.—Pressure Block for Planing Machines.—John Lawrance, East Morrisania, N. Y., assignor to Alfred T. Serrell, New York City. Ante-dated Dec. 14, 1862.

I claim the sectional pressure block constructed substantially as specified to hold the material against the action of the rotary cutter for the purposes set forth.

I also claim the arrangement of the shaft, h, arm, 3, nuts, 5, and screws, o, to give the required pressure and control the motion of the pressure block as set forth.

### 39,997.—Bobbin Winder.—Dustin F. Mellen, assignor to himself and J. C. Wilder, Manchester, N. Y. Ante-dated Sept. 7, 1862:

I claim the toothed wheel, C, the periphery of which is provided with gears to drive the bobbin or spool, and the side with concentric rows of cogs, in combination with the adjustable pinion, Z, substantially as and for the objects specified.

### 39,998.—Bleaching Textile Fabric.—Theodore Schnebley' assignor to Jeremiah Meyer, Bay Ridge, N. Y. Ante dated Jan. 8, 1862:

I claim the within-described process for bleaching textile fabrics by treating them with the liquors herein set forth, and applied in the order and substantially in the manner specified.

[This invention consists in the peculiar manner and order in which fabric to be bleached is treated with certain well-known liquors, all and every one of which are applied cold, and the effect of which is such that the bleaching of cotton and other textile fabrics can be completed in from three to three and a half hours without injury to the fabric, and that by this process the goods are bleached just as perfect as by the ordinary tedious process.]

### 39,999.—Device for Stopping and Starting Railroad Cars.—Joseph Steger, assignor to Charles W. Baker, Ne York City:

I claim the clutches, I M, when used in combination wtih suitable internal gearing drums and springs, applied and operating for the purpose and in the manner substantially as shown and described.

Second, So combining the treadle, k, with the hand lever, J, and clutches, I M, that by depressing the treadle the clutch, M, is applied and the clutch, I, released substantially in the manner set forth.

[The object of this invention is to accumulate or save the momentum of a car as the same is stopped, and to apply the momentum thus saved to start or to assist in starting the car.]

### 40,000.—Sewing Machine.—Dwight Tracy and George Hobbs, Worcester, Mass., assignor to Dwight Tracy, aforesaid:

First, In a sewing machine which forms the stitches by means of a needle and rotating hook, as described, we claim the delivering to the needle, at each stitch, a measured length of the needle thread, corresponding to the thickness of material to be sewed and the length of the stitches to be made, and the drawing up of such measured length of thread, by a uniform and positive action to complete the stitch by means of the needle and its actuating mechanism, and the griper for holding and controlling the needle thread above the cloth, and the rotating hook and loop check for holding and distending the loop of needle thread below the cloth, or other device equivalent thereto, so combined and arranged to co-operate substantially in the manner herein described.

Second, The employment in combination with the device which controls the needle thread in delivering the same to the needle and tightening the stitch, of a device for drawing sufficient thread from the bobbin to make the next stitch in advance of its delivery to the needle, substantially in the manner and for the purpose described.

Third, forming the clamping device or griper for the needle thread by a combination of the bent lever, L', with the plate, K', on the needle arm or their equivalents and operated by the stop, i, on the connecting rod M', substantially as described,

Fourth, The employment in combination with the rotating hook of a spool case placed diagonally to the axis of motion of the hook and held in position by any appropriate devices; to enable a large bobbin to be used, and the coop of needle thread to be passed around it more readily, substantially as described.

Fifth, The employment in combination with a needle thread of the loop shock, so called, constructed and operating substantially as described.

Sixth, The employment of a detached or movable feed dog as described.

[The principal object of this invention is so to control the operation of the needle thread in that kind of sewing machine known as the rotary-hook sewing machine, that the quantity supplied to the needle may be always in proportion to the thickness of the cloth or other material to be hemmed, and to the length of the feed-movement, and that a uniform tightness of stitch may be produced, whatever variation may occur in the thickness of the material, or however the feed-movement may be varied; and this part of my invention may be said to consist in an adaptation to that kind of sewing machine of the same elements viz., a thread-griper or clamping device, and an independent thread-drawing device, described for the same purpose in Dwight Tracy's Letters Patent (No. 30,012), such Letters Patent describing their application to the shuttle machine. The thread-clamping device in this invention consists in a griper connected with the needle arm, and the thread-drawing device consists in what we have called the loop-check, owing to its performing also the duty of what is known by that name in the rotating-hook machine, though differently constructed and applied.]

### 40,001.—Machine for Making Paper Bags.—Joseph Wells, (assignor to Orlando A. Wilcox), Hoboken, N. J. Ante-dated March 19, 1863:

I claim first, The combination of two sliding tables, I and H H, for the purpose substantially as set forth.

Second, The bag folder, J J, by which the bag itself is folded (permitting the bag to be drawn from it although the folder should remain closed on the table, I,) separately and in combination with the table, I, and the binder, C, substantially as set forth.

Third, the binder, C, for holding one half of the paper form on the table, I, while the other half is being folded over it, separately and in combination with the table, I, and the slides supporting said tables substantially as set forth.

Fourth. The combination of the roller, T, with the sliding table, H H, and the strips, X X, for the purpose as substantially set forth.

Fifth, The combination of the lap folders, W W, with the thin edged wheels, V V, and the roller, T, substantialy as set forth.

Sixth, The combination of the lap folders, W W, with the table, H H, elevated strips, X X, and the roller, T, substantially as set forth.

Seventh, The use of the braces, P P, for the purpose, substantially as set forth.

Eighth, The taking of the paper forms from the feeding table by the bag folder, J J, substantially as set forth.

Ninth, The application of the paste by pressure, as substantially set forth.

### 40,002.—Camp Stool or Chair.—A. D. Whitmore (assignor to E. W. Vaill), Worcester, Mass.:

I claim the combination of the legs, A B, seat, C, back, D, and hinges, E e, when the parts are all constructed and arranged in the manner and for the purpose represented and specified.

[This invention is a modification of that covered by Letters Patent, granted to E. W. Vaill, on the 6th of January and the 7th of April 1863.]

### 40,003.—Subsoil Plow.—G. W. N. Yost, (assignor to himself and William Dilworth, Jr.), Nashville, Tenn.:

I claim the U-shaped holder, A, constructed and operating substantially as herein set forth, for the purpose of combining a subsoil plow B, with a furrow plow, C.

### 40,004.—Wheel Dressing Machine.—Hiram S. Jacobs, Portland, Oregon:

I claim, first, The concave plate, C, provided with a centering pin. B2, and clamp hooks, D D', operating substantially as and for the purposes set forth.

Second, The combination with a suitable face plate, of the cutters, H1 H2 H3, driven simultaneously by hands from a common drum, E, in the manner and for the purposes explained.

Third. The reamer, M, carried by an advancing and receding stock, N, in the described combination with the yielding center pin, B2, for the objects specified.

Fourth, In combination with the cutters, H1 H2 H3, driven by belts from a common drum, E, as explained, I claim the sliding table. G, and segmental guides, by means of which the said cutters may be adjusted in the arc of a circle concentric with the said drum in order to adapt the machine to operate on wheels of any size.

Fifth, In combination with cutters, H1 H2 H3, operated in the manner explained, I also claim the use of guide ways or bearings adjustable on vertical axis, in order to admit of dressing the face, back and tread of the wheel to any required bevels.

[This machine dresses the rim of the wheel on the front back and tread simultaneously, and reams the hub concentrically therewith. The mode of chucking the wheel adapts the machine to operate with equal success on wheels of imperfect form, and to reduce them to correct shape and proportions with great facility.]

## RE-ISSUES.

### 1,536.—Operating Gun and Gun Tower.—James B. Eads. St. Louis, Mo. Patented March 31, 1863.

I claim making the gun tower in sections, so that the top section may be lowered into the hold of the vessel, for the purpose and in the manner substantially as described.

I also claim depressing and elevating the aim of the gun whilst the muzzle is kept at or near the center of the porthole by raising and lowering the carriage of said gun, substantially in the manner and for the purposes herein described.

I also claim leveling the gun in the tower, in the act of raising it, by means of the tripping pin near its point or muzzle and the guide on the tower, so that a very small port may be used, as the gun must enter it fairly without striking the sides of the port, substantially as described.

I also claim the causing of the recoil of the gun, or its recoil or reaction, to open the steam ports of the cylinder that moves it out and in, and thus cause the steam to resist the recoil, or recoil and reaction.

### 1,537.—Liquid for Galvanic Batteries.—D. H. Fitch, Jr.' Litchfield, Ill. Patented June 16, 1863:

I claim the use of chlorate of potassa in combination with sulphuric acid and water for the purpose specified.

I claim also the use of the salts of chloric acid in combination with sulphuric acid and water for the purpose specified, their action being substantially the same as chlorate of potassa.

I claim also the use of chloric acid when obtained by the decomposition of a chlorate by sulphuric acid, for the purpose specified.

### 1,538.—Knitting Machine.—John Pepper, Holderness, N. H. Patented July 17, 1855.

I claim, first, the bar, e, with its grooves, c' having its rear elevated above its forward portion, for the purpose of preventing the needle from rolling, as described.

Second, In combination with the hooked sinkers and ribbed needles made to operate substantially as described, I claim the series of cast-off sinkers or those formed without hooks, the same being arranged in the sinker bar, and not only so as to admit the rib needles to work between the hooked sinkers, but so as to render the machine capable of performing either plain or ribbed work as specified. I also claim making the ribbed needle take the place of the front or hook of the sinker in forming the loops for the rib stitch.

### 1,539.—Hair Crimper.—Abby A. Livingston (assignee of W. F. George) New York City. Patented Jan. 29, 61:

I claim first, A hair crimper formed of a pair of fluted or corrugated plates or blocks, D, of any suitable material connected by a hinge or hinges, B, attached either directly to the plates or blocks or through the medium of separate backs, A, and this I claim either with or without the handles, C.

Second, I also claim the handles, C C, connected by hinges, a a, to the corrugated blocks or plates, D, or backs, A, in the manner and for the purpose set forth.

[This is the apparatus by which the waved or crimped appearance, now so much in vogue, is imparted to ladies hair.]

### 1,540.—Machine for Drawing Bolts.—Seth Nilwarth, Charleston, Mass. Patented Nov. 29, 1859:

I claim the combination of the stock or frame to form a rest against the timber from which a spike is to be drawn, the griping jaws to take hold of the bolt, the rotating nut and the hollow lifting screw for drawing the jaws by a wedge-like action, so that the force applied to draw the bolt shall act upon the jaws and cause them to grasp the bolt by a force corresponding to the force required to draw it, the screw being tubular or hollow, and the jaws being so constructed as to permit the bolt to pass them substantially as herein described.

And I also claim the hollow ram in combination with the stock, the lifting screw and the griping jaws, substantially as and for the purpose specified.

## EXTENSION.

### Cooking Range.—Philip Rollhaus, New York City. Patented Sept. 11, 1849:

I claim the arrangement of the inclined flues, E, at the sides of the ovens, and inclined flues, F, at the back parts of the same, in combination with the diagonal plates, G, and the dampers, H, for either causing the heat to pass directly from the fire chamber into the chimney over the tops and down the sides, after enlarging its volume below, up behind the ovens as herein set forth.

NOTE.—The number of patents issued from the United States Patent Office last week and reported above is one hundred and thirty-nine. Of this number *forty-five* were obtained through the Scientific American Patent Agency.

## Binding the "Scientific American."

It is important that all works of reference should be well bound The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is preserved by a large class of its patrons, lawyers and others, for reference Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we commenced on the expiration of Volume VII. to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style is 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, No. 37 Park Row, New York

## Back Numbers and Volumes of the Scientific American

VOLUMES I., II., III., IV., V., VII. AND VIII. (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $2 25 per volume, by mail, $3—which includes postage. Every mechanic, inventor or artizan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. VOL. VI. is out of print and cannot be supplied.

# Notes and Queries

J. W. L., of N. C.—You will find the lever, the pulley and inclined plane—the mechanical powers—illustrated and explained in almost every handbook for mechanics, but especially in "Monge's Statistics."

E. G. G., of Mass.—Old tinware clippings are now economized by having the tin removed from them by a strong alkali, and using it as a mordant in calico printing. The iron of the clippings is of little value, but it also may be utilized like other scrap iron.

A. D., of N. Y.—Your comments on the article reprinted from the *Boston Journal* are correct, but you have taken unnecessary trouble to remind us of the errors or want of knowledge of an army correspondent. The paragraph alluded to is objectionable, and should have been struck out. The rest of the matter is simply a narrative of facts, on which we have not seen fit (as yet) to express an additional opinion.

L. P., of N. Y.—A minor can take out a patent, and can sell it without the consent of any one.

F. G. N., of Mo.—Steel has been frequently used for mills, but is not adapted for grinding wheat.

J. R., of Wis.—If you grind the dry silicate of soda to powder and boil it in water, you will probably dissolve it; if not then add some caustic alkali to the water and you will obtain a solution of the silicate. The silicate of soda is manufactured in a liquid near this city.

T. H. W., of N. Y.—This correspondent wishes to know the area of a safety valve of the following dimensions; here is inserted a sketch in his note representing a weight, lever, valve and fulcrum, and the figures 2,000 pounds pressure marked on the valve. There is no other data. We modestly suggest that it is slightly unreasonable to send such a diagram, accompanied by such a request. If you wish to know the area of a safety valve, square the diameter and multiply the product by 0 7854, that will give the area of any circular disk. The diameter is not to be taken from the flat surface of the bottom, but from a point half way in the middle of the seat.

R. T. C., of Ill.—The atmosphere of houses heated with hot water flowing through pipes has usually been considered more soft and pleasant than the air of houses heated with hot-air furnaces. We do not know the reason why hot-water heaters have been discontinued in the building to which you refer. Air passed over very highly-heated iron plates becomes unfit for respiration; the air heated by hot water is moderate in its temperature.

O. R., of Mass.—Make your speaking tube of 350 feet with curved instead of angular joints, if you can do so; if not angular joints will not prevent a tube of such a length from answering your purpose. An iron pipe will do just as well as a tin one; and it may vary from one to two inches in diameter.

A. C. M., of Pa.—A ball shot vertically from a gun will reach the earth again with the same velocity with which it started, minus the loss caused by resistance of the atmosphere.

T. C. W., of Conn.—Cloth-folding and measuring machines are used in bleach works, calico print works and many other establishments.

## Money Received

**At the Scientific American Office, on account of Patent Office business, from Wednesday, Sept. 16, to Wednesday, Sept. 23, 1863:—**

O. P. of Vt., $20; E. W. S., of N. Y., $16; G.M. Jr., of Ill., $20; N. S. W., of N. Y., $22; G. G. H., of Conn., 41; T. D. L., of N. H., $50; B. & B., of N. Y., $16; D. & W., of Mass., $25; G. T., of N. Y., $16; A. A. S., of Mich., $20; H. J. S., of N. Y., $20; J. T. G., of Iowa, $17; R. T. S., of N. Y., $61; H. F. & T. R. B., of Iowa, $25; M. M. C., of Ill., $21; W. S. D., of Pa., $16; R. R. C., of N. Y., $25; E. H. G., of N. Y., $16; D. R. P., of Mass., $15; J. C., of N. Y., $28; J. Van De V., of Mich., $16; W. & B., of Mass., $28; R. J. S., of N Y., $16; J. M. M., of N. Y., $25; G. L., of N. Y., $20; F. & B., of R. I., $20; A. J. M., of N. Y., $46; J. B. H. Jr., of N. Y., $22; K. C. & R., of Wis., $20; J. M., of N. Y., $16; E. C., of N. Y., $20; E. S, H., of N. Y., $16; S. G., of Ill., $20; R. S., of N. Y., $45; S. & P., of Ill., $16; W. B. W., of N. Y., $16; H. H., of Pa., $16; S. B. W., of Kansas, $25; J. D. C., of Ill., $26; C. S., of N. Y., $10; A. M. & J. I. D. B., of Ill., $26; G. E. H., of N. Y., $25; E. J. S., of Md., $20; A. C. T., of Ill., $16; C. B. D., of Ind., $26; K. & E., of Iowa, $15; C. F. B., of N. Y., $12; M. F., of N. Y., $25; S. S. D., of Ill., $45; L. & P., of N. Y., $16; J. H. R., of N. Y., $16; J. F. J., of N. Y., $20; C. S., Van O., of N. Y., $16; E. L. M., of N. Y., $16; H. F. B., of Ill., $20; J. W. Jr., of Ky., $20; G. & G., of N. Y., $16 R. S. H., of Iowa, $16; A. K., of Pa., $28; W. H., of Wis., $15; J. F.; of N. S., $26; T. & J., of N. Y., $16; G. W. H., of Pa., $16; A. M. G., of Ill., $20; S. & H., of Mich., $20; T. T., of Pa., $28; D. D., of N. Y., $16; W. A. T., of Va., $22; D. D., of N. Y., $25; R. H. R., of N. Y., $25; D. J. S., of N. Y., $20.

**Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.**

**Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Wednesday, Sept. 16, to Wednesday, Sept. 23, 1863:—**

J. M. M., of N. Y.; C. F. B., of N. Y.; D. D., of N. Y.; A. J. M., of N. Y. (3 cases); M. F., of N. Y.; R. H. R., of N. Y.; J. F. J., of N. Y.; J. C. H., of Conn.; N. S. W., of N. Y.; J. B. H., of N. Y.; A. T., of N. Y.; A. K., of Pa.; W. G., of N. Y.; J. D. C., of Ill.; J. C., of N. Y.; A. M. & J. D. B., of Mich.; H. F. & T. R. B., of Iowa; R. R. C., of N. Y.; S. B. W., of Kansas; W. H. J., of Ind.; J. F., of N. S.; M. M. C., of Ill.; S. & H., of Mich.; G. E. H., of N. Y.; T. T., of Pa.; W. & B., of Mass.; C. B. D., of Ind.

© 1863 SCIENTIFIC AMERICAN, INC.

## RATES OF ADVERTISING.

**Twenty-five Cents** per line for each and every insertion payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement hey may deem objectionable.

---

MAIN & BROWN ON MARINE STEAM ENGINE.—Just published. Questions on subjects connected with the Marine Steam Engine and Examination Papers, with hints for their solution. By Thomas J. Main, M. A. F. R., Ast. S., Math., Prof. R. N. College, Portsmouth, and Thomas Brown, Chief Engineer R. N., attached to the R. N. College, 12mo. $1 50. These questions have been arranged in a progressive order, and whenever any new difficulty presents itself, the question has been either worked out fully, or the various steps of the solution have been inserted. Also published, the Practical Examinator on Steam and the Steam Engine, with instructive references relative thereto, arranged for the use of Engineers, Students and others. By William Templeton, Engineer; 75 cents. Hand-book for Locomotive Engineers and Machinists, comprising the calculations for constructing Locomotives, Manner of Setting Valves, &c., by Septimus Norris 12mo,. $1 50. The Locomotive Engine, including a description of its structure. Rules for estimating its capabilities, and practical observations on its construction and management, by Zerah Colburn, 12mo., 75 cents. Mathematics for Practical Men; being a common-place book of Principles, Theorems, Rules and Tables, in various departments of pure and mixed Mathematics with their application; especially to the pursuits of Surveyors, Architects, Mechanics and Civil Engineers, with numerous engravings. By Olinthus Gregory, 8vo., $1 50.

☞ The above, or any other of my publications, sent by mail free of postage. Every reader of the SCIENTIFIC AMERICAN is particularly invited to send for a catalogue of my Practical and Scientific Books, which will be mailed free of postage. HENRY CAREY BAIRD, Industrial Publisher, 406 Walnut street, Philadelphia. 2

---

KENTISH ON A BOX OF INSTRUMENTS AND THE Slide-rule.—A Treatise on a Box of Instruments and the Slide-rule. For the use of Gagers, Engineers, Seamen and Students. By Thomas Kentish 12mo., $1. *Contents.*—A Box of Instruments, Practical Geometry, Definitions, Compasses, Parallel Ruler, Protractor, Plain Scale; Trigonometry, Sector; Logarithms, Slide-rule, Ratios and Gage Points; Tables, the Circle, Polygons, Linear Dimensions, and Areas of Falling Bodies. Pendulums, Areas of Circles and Surfaces of Spheres, Diagonals of Squares and Cubes, Velocity of Sound, Surfaces, Formula e for Solids, General rule for Frustrums, Formulae for Solids, Weight of Spheres, Solidity of Spheres, Solar System, Miscellaneous Questions, Cash Gaging, Land Surveying, Trigonometry and Navigation, Recapitulation, The Compass, &c.

☞ The above or any other of my publications sent by mail free of postage. Every reader of the SCIENTIFIC AMERICAN is particularly invited to send for a catalogue of Practical and Scientific Books, which will be mailed free of postage. HENRY CAREY BAIRD, Industrial Publisher, 406 Walnut street, Philadelphia. 1

---

TO MERCHANTS, BOOK-KEEPERS AND ACCOUNTants. A new article, long desired and much wanted by every mercantile man, is—

FOWLER'S ADDING MACHINE.

It is simple in construction, easy to learn and operate, and invaluable for use, for proof of which try one. Price, with full directions, $5 each. For cut and description see SCIENTIFIC AMERICAN, Vol. IX, No. 10, N. B.—State and County Rights may be had on reasonable terms by addressing G. B. FOWLER & Co., 37 Park-row, New York, or Box 3,213, Chicago, Ill. 13 2*

---

J. E. STEVENSON & CO.,
Machinery Brokers, Consulting Engineers, and Agents for the introduction of all kinds of improved machinery, 200 Broadway, New York. 14 6*

---

WATER WHEELS.—WARREN'S TURBINE WHEEL and improved oil stop, is acknowledged by cotton and woolen manufacturers, and those who are making the greatest saving in the use of water, to be superior to all other wheels in the country. For illustrated circular, address A. WARREN, Agent, American Water Wheel Company, No 31 Exchange street, Boston, Mass. 14 12

---

WANTED TO BORROW BY AN INVENTOR, FIVE Hundred dollars, to take out five Patents for five good useful and valuable inventions; for further information address INVENTOR, care of MUNN & Co., Patent Agents, Washington, D. C. 1*

---

ANDREW'S PATENT OSCILLATING ENGINES ARE light, strong, cheap and economical, leave the shop ready for use, and require no special foundation. 11 sizes are made, from 1 to 60 horse-power, and larger sizes to order. WM. D. ANDREWS & BRO., Manufacturers, 414 Water street, New York. 14 8*

---

ANDREWS' PATENT CENTRIFUGAL PUMPS FOR all liquids, hot or cold. The most simple, durable and economical power pumps made. Will pass 25 per cent of sand and gravel without injury. For price lists address the manufacturers, WM. D. ANDREWS & BRO., 414 Water street, New York.
N B.—Pumps kept for hire, engineers and power furnished; for wrecking, coffer dams, sewers, cellars and sand pumping. 14 8*

---

NEW STEAM BOILER FOR SALE.—TWENTY-FIVE feet long, 36 inches diameter, over 14 in., flue, steam dome 24 by 27 inches. will stand safely 150 pounds of steam to the inch. Address EAGLE WORKS, Harrisburg, Pa. 14 3*

---

SECOND HAND IRON PLANERS FOR SALE.—ONE fourteen feet bed, three feet between uprights, weighs about 6½ tuns. Cash $1.250 and is nearly new. Also, one five feet bed, has been used about six months. Also a good suspension drill. Also a new hand lathe, iron bed, swing 25 inches. Address GEORGE GAGE & SON, Waterford, N. Y. 14 2*

---

THE OIL TRADE REVIEW AND PETROLEUM RECORDER, is published by JOHN HILLYER, 249 Pearl street, New York City, at $1 50 per annum. 1*

---

ONE NEW AND ONE SECOND-HAND WOODWORTH Floor Board Planers. Address J. A. FAY & CO., Worcester, Mass. 1*

---

THE "KING MICROSCOPE"—DOUBLE LENS.—Prof. Horsford, of Harvard University, says: "It works very well, and you have got it up very neatly." Magnifies 25 diameters—55 cents in Postal Currency. The "BOWEN" microscope, 28 cents. The "S. WOODWARD" microscope, 38 cents. Or one each of the three kinds for $1. All free of postage. Address T. EDWIN KING, Box 330, Boston, Mass. 12 4*

---

SEWING MACHINES.—GROVER & BAKER'S NEW Lock-stitch Machine, No. 9, 495 Broadway. This is the best and cheapest machine for Tailors' use ever produced. Price $45. 13 13

---

R. J. IVES, BRISTOL, CONN., MANUFACTURES all kinds of machine and fancy screws. Address as above. 6 10*

---

ROTARY BOILERS.—WE HAVE ON HAND AND for sale, two Rotary Boilers, made of ½-inch iron, 22 feet long, 6 feet in diameter, 6-inch heads, with safety valves and all gearing necessary for operation of them. They were manufactured by J. A. Brooks & Co., of Frankfort, Pa., and are in perfect order. Address PEASLEE & CARPENTER, Ancram Paper Mills, Ancram, N. Y. 13 3*

---

IRON PLANERS, ENGINE LATHES, DRILLS AND other machinists' tools, of superior quality, on hand and finishing, for sale low. For description and price address NEW HAVEN MANUFACTURING COMPANY, New Haven, Conn. 1tf

---

## A VALUABLE WORK FOR INVENTORS PATENTEES AND MANUFACTURERS.

The publishers of the SCIENTIFIC AMERICAN have just prepared, with much care, a pamphlet of information about Patents and the Patent Laws, which ought to be in the hands of every inventor and patentee, and also of maufacturers who use patented inventions. The character of this useful work will be better understood after reading the following synopsis of its contents:—

The complete Patent Law Amendment Act of 1861—Practical Instructions to Inventors, how to obtain Letters Patent, also about Models—Designs—Caveats—Trade-marks—Assignments—Revenue Tax—Extensions—Interferences—Infringements—Appeals—Re-issues of Defective Patents—Validity of Patents—Abandonment of Inventions—Best Mode of Introducing them—Importance of the Specification—Who are entitled to Patents—What will prevent the Granting of a Patent—Patents in Canada and European Patents—Schedule of Patent Fees; also a variety of miscellaneous items on patent law questions.

It has been the design of the publishers to not only furnish, in convenient form for preservation, a synopsis of the PATENT LAW and PRACTICE, but also to answer a great variety of questions which have been put to them from time to time during their practice of upwards of *seventeen years*, which replies are not accessible in any other form. The publishers will promptly forward the pamphlet by mail, on receipt of six cents in postage stamps.

Address MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, No. 37 Park Row, New York. 9

---

INCREASE YOUR BUSINESS—NEW YORK STATE Business Directory for 1864. The last number of this valuable work was published by us in 1859. We now propose issuing another number about Jan. 1, 1864, on an enlarged and much improved plan, embracing the names, occupation and Post-office address, of all merchants, manufacturers, and other business men, in every city and town throughout the State. Classified and arranged under the appropriate headings, representing the business in which they are engaged; thus furnishing complete and accurate lists of more than 100,000 persons. A complete index to the immense business, wealth and enterprise of the Empire State, price $5: also lists of Banks, Insurance and Manufacturing Companies, Post-offices, Newspapers, Academies, Railroads, Expresses, &c. No money in advance is received. Our agents are not allowed under any circumstances to receive money in advance of publication. The name of every business man throughout the State is inserted in this work without charge. Those who wish a more extended account of their business will have an opportunity afforded them in the advertising department at a moderate cost. ADAMS, SAMPSON, & CO., Publishers, to whom orders may be addressed at the Albany Directory Office, 78 State street, Albany, N. Y., or the Boston Directory Office, 91 Washington street, Boston, Mass. 12 3*

---

$200, $150, $100, $50 PREMIUMS.—TO EDITORS, Ladies and Others. I will pay the above-named amounts for the best four articles on either my Soap, Saleratus, or Concentrated Potash. The article must state the writer's experience in using the goods, and must be not less than ten lines, and be published in the editorial columns of any good family newspaper. Any party wishing to compete for the above, and desiring further information, may address the undersigned. Each person writing and publishing a notice, as above, will mail a marked copy of the paper containing the notice to me, and also write me by mail, giving full address. The Premiums will be awarded on the fourth day of July, 1864. B. T. BABBITT, 64 to 74 Washington street, New York. 12 tf

---

A GREAT WORK! EVERY MAN HIS OWN PHYSIcian.—The New Illustrated Hydropathic Encyclopædia; a complete system of Hydropathy, embracing the Anatomy and Physiology of the Human Body, illustrated; Hygienic Agencies, and the Preservation of Health; Dietetics and Cookery; Theory and Practice of Treatment; Special Pathology and Hydro-Therapeutics, including the Nature, Causes, Symptoms and Treatment of all known Diseases; Application to Surgical Diseases, and to Mid-wifery and the Nursery. With three hundred engravings, nearly one thousand pages, including a Glossary and Index complete. By R. T. Trall, M.D. Sent prepaid by first mail for $3·50. Address FOWLER & WELLS, 308 Broadway, New York. 13 2

---

FOR SALE.—A NEW PATENT REVOLVING EIGHTchambered Fire-arm. Simple in its construction and an excellent shooting arm, carrying a ball with great force and unequalled correctness. Any information desired respecting it can be obtained by addressing Box 949, Post-office, Hartford, Conn., which will meet with immediate response. 1*

---

THE SIXTEENTH ANNUAL EXHIBITION OF THE Maryland Institute, for the Promotion of the Mechanic Arts, will be opened in the Institute's Spacious Hall, Baltimore, on the 5th day of October, and continue to the 2d day of November. The mechanics, manufacturers, artists and business men of the country are cordially invited to contribute to this exhibition. Circulars containing regulations and arrangements will be furnished promptly by application to JOHN S. SOLLY, Actuary of the Institute. W. W. MAUGHLIN, Chairman of Committee. 12 3

---

HARRISON'S GRIST MILLS—20, 30, 36 AND 48 inches diameter, at $100, $200, $300 and $400, with all the modern improvements. Also, Portable and Stationary Steam Engines of all sizes, suitable for said mills. Also, Bolters, Elevators, Belting, &c. Apply to S. C. HILLS, No. 12 Platt-street, New York. d

---

REYNOLDS' TURBINE—THE BEST WATER WHEEL in use. Simple, durable, economical and efficient. 500 of them driving the best mills in the country. Superior, in every respect, to overshot or breast wheels. More than forty sizes manufactured, adapted to all heads. TALLCOT & UNDERHILL, Office 482 Broadway, New York. 13 8*

---

TO INVENTORS.—ANY PARTIES HAVING ANY improved method of manufacturing fine-cut tobacco, either in the machinery, or in the preparation, or of increasing the weight of the same, causing it to keep in a damp state, can sell their discovery at a good price by addressing F. P. C., "Tobacconist," New York city. 13 4*

---

PLATINA! ALL SHAPES! FOR ALL PURPOSES. Imported by SUTTON & RAYNOR, 748 Broadway, N. Y. 11eow4*

---

LANE'S PATENT LIFTING JACK—VERY EASILY operated, compact, simple and cheap. For cut and description see page 405, Vol. VIII. (new series), SCIENTIFIC AMERICAN. Staet rights for sale. Communications in relation to rights or orders for Jacks may be addressed to J. G. LANE, Washington, N. Y. 10 8

---

FIBER-CLEANING MACHINE.—THIS VALUABLE machine, the invention of Eduardo J. y Patrullo, and illustrated on page 368, last volume, SCIENTIFIC AMERICAN, is now on exhibition, where the public are invited to examine it, at the establishment of TODD & RAFFERTY, No. 13 Dey street, New York. 2 13

---

WANTED—SCRAP IRON, OLD BOILERS, AND OLD Iron Machinery.—The subscribers will pay cash for any quantity of Wrought or Cast Scrap Iron, Old Boilers, and Old Iron Machinery, delivered at their warehouse, 28, 30, and 32 Terrace street, Buffalo, or at their Rolling Mill and Nail Factory, Black Rock, N. Y.
Buffalo, July, 1863. PRATT & CO
2 16*

---

FAN BLOWERS—DIMPFEL'S, ALDEN'S, McKENZIE'S and others, for Steamboats, Iron Works, Founderies, Smith Shops, Jewelers, &c., on hand for sale by LEACH BROTHERS, 86 Liberty street, New York. 2 13*

---

THE INDUSTRIAL CHEMIST—DEVOTED TO PRACtical science, arts, manufactures, agriculture and industry in general. The first volume is ready, and the second volume is now publishing, by JOHN HILLYER, 249 Pearl street, New York, at One Dollar and Fifty Cents per volume. 1*

---

MASON'S PATENT FRICTION CLUTCHES, FOR connecting and disconnecting shafting, also for hoisting machinery, and for starting all heavy machines without sudden shock, are manufactured by WILLIAM MASON, Providence, R. I. 12 4*

---

## THE CHEAPEST MODE OF INTRODUCING INVENTIONS.

INVENTORS AND CONSTRUCTORS OF NEW AND useful Contrivances or Machines, of whatever kind, can have their Inventions illustrated and described in the columns of the SCIENTIFIC AMERICAN on payment of a reasonable charge for the engraving.

No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no second-hand or poor engravings, such as patentees often get executed by inexperienced artists for printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. And it is not our desire to receive orders for engraving and publishing any but good Inventions or Machines, and such as do not meet our approbation in this respect, we shall decline to publish.

For further particulars address—

MUNN & CO.,
Publishers of the SCIENTIFIC AMERICAN,
No. 37 Park Row, New York City

---

OIL! OIL! OIL
For Railroads, Steamers, and for Machinery and Burning. PEASE'S Improved Engine and Signal Oil, indorsed and recommended by the highest authority in the United States. This Oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough and practical test. Our most skillful engineers and machinists pronounce it superior to and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The SCIENTIFIC AMERICAN, after several tests, pronounces it "superior to any other they have ever used for machinery." For sale only by the Inventor and Manufacturer, F. S. PEASE, No. 61 Main street, Buffalo, N. Y.
N. B.—Reliable orders filled for any part of the United States and 12tf

---

WILLIAMS & PAGE'S PASSENGER CAR LAMP, for Kerosene or Coal Oil. These lamps, now in use on a large number of Railroads, are very neat and ornamental, and, being enclosed in a brass case, which is firmly secured to the side of the cars, entirely avoid the dripping of oil on passengers and car cushions. The light is very strong and brilliant, requiring no reflectors, and lighting up the cars so as to give them that bright and cheerful appearance so much desired by roads for the pleasure and comfort of their passengers. These lamps are strong and durable, and are as easily taken care of as any in use. A full-sized drawing sent, when requested. For cars with high or raised roofs we make these lamps with brass arms to suspend in any required manner. Manufactured and for sale by WILLIAMS & PAGE, 67 Water street, Boston, Mass. 11 3*

---

REAPERS AND MOWERS INDEPENDENT AND "Combined."—Parties desirous of engaging in the manufacture of those successful and popular machines, the "Cayuga Chief," "Cayuga Chief No. 2," or "Cayuga Chief, Jr.," can address the patentee, C. WHEELER, Jr., Poplar Ridge, Cayuga County, N. Y. 10 8*

---

DISCHARGED SOLDIERS AND OTHERS ARE MAking enormous wages in the Stencil business. Don't fail to send for a free Catalogue containing full particulars. Address MILLIKEN & DAVIS, Brandon, Vt. 10 6*

---

GUILD & GARRISON'S CELEBRATED STEAM Pumps—Adapted to every variety of pumping. The principal styles are the Direct Action Excelsior Steam Pump, the improved Balance Wheel Pump, Duplex Vacuum and Steam Pumps, and the Water Propeller, an entirely new invention for pumping large quantities at a light lift. For sale at Nos. 55 and 57 First street, Williamsburgh, and No. 74 Beekman street, New York.
1 tf GUILD, GARRISON & CO

---

SAVING OF FUEL TO PARTIES USING STEAM.—DAMPER REGULATORS.
Guaranteed to effect a great saving in fuel, and give the most perfect regularity of power. For sale by the subscribers, who have established their exclusive right to manufacture damper regulators, using diaphragms or flexible vessels of any kind. CLARK'S PATENT STEAM AND FIRE REGULATOR COMPANY No 5 Park Place, New York. 16 26*

---

PORTABLE STEAM ENGINES—COMBINING THE maximum of efficiency, durability and economy with the minimum of weight and price. They are widely and favorably known, more than 200 being in use. All warranted satisfactory or no sale. A large stock on hand ready for immediate application. Descriptive circulars sent on application. Address J. C. HOADLEY, Lawrence, Mass. 2 13

---

STOVE POLISH.—A FIRE-PROOF ARTICLE. Q. & SON, 114 John street, N. Y. 11 13

---

BLACK DIAMOND STEEL WORKS, PITTSBURGH Pa. PARK, BROTHER & CO., manufacturers of best quality Refined Cast Steel, square, flat and octagon, of all sizes. Warranted equal to any imported or manufactured in this country. Office and Warehouse, Nos. 149 and 151 First street, and 120 and 122 Second street, Pittsburgh, Pa. vol. 8 11 1y*

---

POWER LOOM WIRE CLOTHS AND NETTINGS, superior in quality and at low prices, by the CLINTON WIRE CLOTH COMPANY, Clinton, Mass. N. B.—Our trade-mark "Power Loom Wire Cloth." vol 8 24 31*

---

VULCANIZED RUBBER—
Adapted to mechanical purposes—MACHINE BELTING, STEAM PACKING, VALVES, HOSE, EMERY VULCANITE WHEELS, &c. &c. Directions, prices, &c., can be obtained on application to the NEW YORK BELTING AND PACKING COMPANY,
Nos. 37 and 38 Park Row, New York.
JOHN H. CHEEVER, Treasurer. 4tf

---

## Zur Beachtung für deutsche Erfinder.

Die Unterzeichneten haben eine Anleitung, die Erfindern das Verhalten angibt, um sich ihre Patente zu sichern, herausgegeben, und verabfolgen solche gratis an dieselben.

Erfinder, welche nicht mit der englischen Sprache bekannt sind, können ihre Mittheilungen in der deutschen Sprache machen. Skizzen von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen beliebe man zu addressiren an

Munn & Co.,
37 Park Row, New-York.

Auf der Office wird deutsch gesprochen.

Daselbst ist zu haben:

## Die Patent-Gesetze der Vereinigten Staaten.

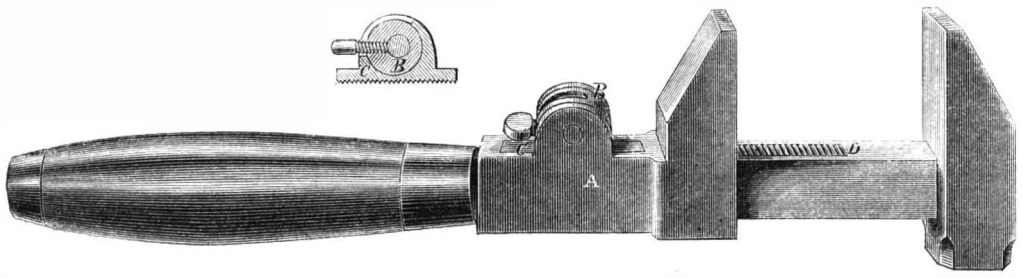
nebst den Regeln und der Geschäftsordnung der Patent-Office und Anleitungen für den Erfinder, um sich Patente zu sichern, in den Ver. St., sowohl als in Europa. Ferner Auszüge aus den Patent-Gesetzen fremder Länder und darauf bezügliche Rathschläge; ebenfalls nützliche Winke für Erfinder und solche welche Patentiren wollen.

Preis 20 Cts., per Post 25 Cts.

© 1863 SCIENTIFIC AMERICAN, INC.

### Improved Adjustable Wrench.

A good screw wrench is one of the most indispensable of tools : the range of sizes of different nuts and bolt heads varies greatly even in those of the same diameter and pitch of thread. This is sometimes owing to the rough work of blacksmiths, and in other cases to an oversight or carelessness on the part of those who finish the nuts used in machine shops. Wrenches made specially for one size of nut cannot, of course, be used on any other, and in this respect the screw, or, as some call it, monkey wrench

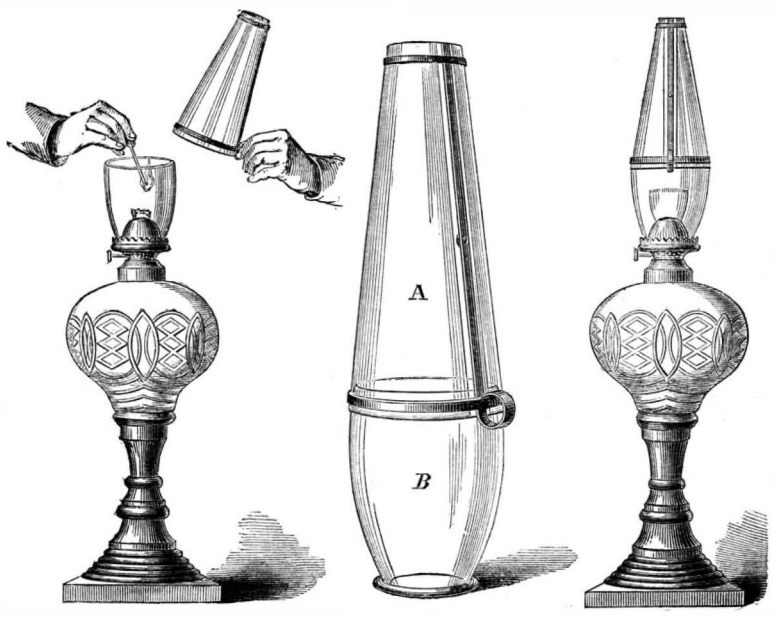



PORTER'S ADJUSTABLE WRENCH.

(an erroneous and senseless cognomen), comes in play, and is, as we have remarked, indispensable. The wrench herewith illustrated is not a screw wrench, being much quicker and more easily adjusted to various sizes than one of that kind. The sliding jaw, A, has an eccentric wheel, B, working on a fulcrum ; this eccentric works in a chamber in the rack-plate, C, and throws the plate into or out of connection with the rack, D, on the shaft of the wrench ; a full section of this may be seen in the small figure : the thumb screw is for the purpose of throwing the plate in and out of gear. This plan of constructing a shifting wrench preserves the full strength of the body, which is not weakened by having a thread cut on it ; it also admits of a long bearing for the sliding jaw, which also strengthens the body ; and it can be immediately adjusted to suit nuts of any dimensions. The length of the ratchet or rack-plate can be increased as much as is desired. This is a very neat and convenient tool ; it was patented on Jan. 20, 1863. The entire patent is for sale or rights. For further information address N. Porter, Youngstown, N. Y.

### Improved Lamp Chimney.

It is a well-known fact that a great drawback to the universal use of kerosene is the breakage of the




MILLAR'S PATENT LAMP CHIMNEY.

lamp chimneys : all who have used it can testify to the truth of this assertion. To obviate the disadvantage thence arising, this chimney was invented. It consists of two parts ; one, B, of glass, and the other, A, of mica ; the upper part being so fitted to the lower that it can be readily removed, thus rendering the wick accessible for trimming and lighting. The several views of this invention explain themselves. The following advantages are claimed for this chimney over the ordinary glass ones :—

The upper part of a chimney heats much more intensely than the lower, from which cause chimneys wholly of glass are liable to sudden fracture. But this chimney, the upper part being made of mica, may heat to any possible degree without injury ; at the same time having nearly the same form as an ordinary glass chimney it will give equally as good a light. Being composed entirely of transparent materials, it does not obstruct any of the rays of light ; while it is also more readily cleaned, and the lamp may be quickly lighted and trimmed.

The patent for this invention was procured through the Scientific American Patent Agency, on July 21, 1863. For further particulars address the inventor and patentee, Henry W. Millar, Utica, N. Y.

### The Frost in the West.

The frost which occurred on the night of the 30th inst., extended over a very large range of country. In Wisconsin, the Milwaukee *Sentinel* states that it did considerable damage to corn and potatoes, though the forward condition of these crops saved them from total ruin. In some localities, says the *Sentinel*, "it arose to the dignity of a freeze—especially upon low ground—ice forming to the thickness of one-fourth of an inch, and upon snch ground crops have suffered most. Garden vines and vegetables have been severely cut, but the loss in that respect is insignificant compared with the damage done to corn. Should the country escape a repetition of these visits, and the weather prove auspicious for the balance of the season, it is quite likely that corn and potatoes may prove much better than is now believed." In Michigan, the corn suffered severely, and the buckwheat and tobacco were almost entirely destroyed.

The Chicago *Tribune*, from its correspondence and dispatches from all parts of Illinois, draws the following conclusion as to the effects of the late frost in Illinois. The corn planted early on high ground has escaped with but little injury, but all late planted corn, and especially that on low ground, is nearly destroyed for commercial purposes. There will be plenty of corn, but in quality it will probably not bear any comparison with the crop of 1862. We advise farmers who have frosted corn, says the *Tribune*, to feed it to hogs and cattle as fast they can.

The Cincinnati *Price Current* states that the accounts of the frost ravages have been much exaggerated; yet, notwithstanding this, it says, there can be no doubt that these frosts have done serious and permanent injury to backward corn, tobacco, cotton, and sorghum, and in short to all tender vegetables, in all the States west of Pennsylvania, and north of the Ohio and Missouri rivers, though they seem to have been severest in Illinois and Indiana. Missouri seems to have escaped, while the damage done in Iowa, Minnesota, and Wisconsin, was comparatively light. Had the corn been as forward as it usually is at the close of August, the frost would not have injured it ; but in some sections it is three to four weeks later.

THE steam navy of France consists of 325 vessels afloat, ranging in size from a first-class frigate to a gunboat. Besides these wooden vessels, there are 6 armor-clad frigates in commission, 10 building, and 42 wooden frigates on the stocks. It is supposed that some of the latter will be converted into armor-plated frigates.


PROSPECTUS

OF THE

SCIENTIFIC AMERICAN.

THE BEST MECHANICAL PAPER IN THE WORLD.

*NINETEENTH YEAR !*

VOLUME IX.---NEW SERIES.

The publishers of the SCIENTIFIC AMERICAN beg to announce that on the fourth day of July, 1863, a new volume commenced, and it will continue to be the aim of the publishers to render the contents of each successive number more attractive and useful than any of its predecessors.

The SCIENTIFIC AMERICAN is devoted to the interests of Popular Science, the Mechanic Arts, Manufactures, Inventions, Agriculture, Commerce, and the Industrial pursuits generally, and is valuable and instructive not only in the Workshop and Manufactory, but also in the Household, the Library and the Reading Room.

The SCIENTIFIC AMERICAN has the reputation, at home and abroad, of being the best weekly journal devoted to mechanical and industrial pursuits now published; and the proprietors are determined to keep up the reputation they have earned during the eighteen years they have been connected with its publication.

*Chemists, Architects, Millwrights and Farmers !*

The SCIENTIFIC AMERICAN will be found a most useful journal to them. All the new discoveries in the science of chemistry are given in its columns, and the interests of the architect and carpenter are not overlooked ; all the new inventions and discoveries appertaining to those pursuits being published from week to week. Useful and practical information pertaining to the interests of millwrights and millowners will be found published in the SCIENTIFIC AMERICAN, which information they cannot possibly obtain from any other source ; subjects in which planters and farmers are interested will be found discussed in the SCIENTIFIC AMERICAN ; most of the improvements in agricultural implements being illustrated in its columns.

*To the Inventor !*

The SCIENTIFIC AMERICAN is indispensable to every inventor, as it not only contains illustrated descriptions of nearly all the best inventions as they come, but each number contains an Official List of the Claims of all the Patents issued from the United States Patent Office during the week previous ; thus giving a correct history of the progress of inventions in this country. We are also receiving, every week, the best scientific journals of Great Britain, France and Germany ; thus placing in our possession all that is transpiring in mechanical science and art in those old countries. From those journals we shall continue to transfer to our columns copious extracts of whatever we may deem of interest to our readers.

*To the Mechanic and Manufacturer !*

No person engaged in any of the mechanical pursuits should think of doing without the SCIENTIFIC AMERICAN. It costs but six cents per week ; every number contains from six to ten engravings of new machines and inventions which cannot be found in any other publication. It is an established rule of the publishers to insert none but *original* engravings, and those of the first class in the art, drawn and engraved by experienced artists, under their own supervision, expressly for this paper.

TERMS.

To mail subscribers :—Three Dollars a Year, or One Dollar for four months. One Dollar and Fifty Cents pay for one complete volume of 416 pages ; two volumes comprise one year. A new volume commenced on the fourth day of July, 1863.

CLUB RATES.

| | |
|---|---|
| Five Copies, for Six Months | $6 |
| Ten Copies for Six Months | 10 |
| Ten Copies, for Twelve Months | 20 |
| Fifteen Copies, for Twelve Months | 30 |
| Twenty Copies, for Twelve Months | 40 |

For all clubs of Twenty and over the yearly subscription is only $2 00. Names can be sent in at different times and from different Post-offices. Specimen copies will be sent gratis to any part of the country.

Western and Canadian money or Post-office stamps taken at par for subscriptions. Canadian subscribers will please to remit 25 cents extra on each year's subscription to pre-pay postage.

MUNN & CO., Publishers,

No. 37 Park-row, New York.


© 1863 SCIENTIFIC AMERICAN, INC.